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SPECIAL ARTICLE.

REPORT OF THE COMMITTEE OF THE MEDICAL BOARD OF BELLEVUE HOSPITAL, APPOINTED JANUARY 2, 1901, TO INVESTIGATE AND REPORT UPON QUESTIONS RELATING TO THE GENERAL ADMINISTRATION OF THE HOSPITAL.

ON January 2d, last, you directed your Committee of Inspection and the President of the Board of Managers of the Mills Training School to report, at as early a date as possible, such suggestions as would tend to the better administration of the Hospital. In accordance with these instructions, we beg leave to submit the following:

The Reception Office.—The Reception Office is utterly inadequate to the demands made upon it. At present, there are from 200 to 300 applicants for admission daily, and from 60 to 100 of these are admitted to this Hospital; the remainder are sent to other Hospitals of the Department or are referred to the Dispensary for treatment.

The space provided was at one time adequate for this work, but the great increase, which the above figures show, taxes the accommodation far in excess of its capacity. The positions of the rooms are such that they are badly ventilated and poorly lighted, and the construction is such that both sexes must be accommodated in the same general admission room, so that here the sober, the intoxicated, the very sick and even those who are fatally injured must be received. At one end of this room partitions are erected, which, however, are not arranged so as to secure privacy, nor maintain for the examining physician the quiet essential to the proper performance of his duties.

We would suggest that more commodious, better lighted and ventilated quarters be found for this work, and that provision be made to secure the order and quiet which is necessary for the examination of patients before they can be properly assigned.

We would also suggest that the physicians, who are engaged in receiving, examining and distributing patients at the Reception Office, be relieved from all clerical duty, as this is a detail which can be performed by a clerk and which, if lifted from the admitting physician, would give him more time for his exacting and important duty.

Granting that the above suggestions are adopted, the fact still remains that the large number of cases which have to be disposed of compels the expenditures of such an amount of time on the part of the House Staff of Physicians and Surgeons that it interferes seriously with their duties elsewhere. We would suggest, therefore, that an arrangement be made by which they may be relieved from this duty and that it be placed upon a staff especially appointed to this work, the details of the arrangement to be determined after conference with the Commissioner.

Number of Cases Admitted to the Hospital in 1900.—In connection with this question it is interesting to note that 24,300 patients were admitted to Bellevue Hospital during the year 1900, and that 11,370 of these were ambulance cases. Many of these 11,370 cases were in such an enfeebled state, either from disease or injury, that they required special care and attention in the Reception Office, but owing to the conditions above mentioned, it was difficult, and in some cases impossible to give it there.

Number of Ambulance Cases for the Same Period.—Of these 11,370 patients, the ambulances belonging to Bellevue brought in 4,616, of whom 128 were so ill that they died within twenty-four hours after admission. The other hospitals in the city delivered 6,754 patients in their ambulances to Bellevue, representing transfers from their own wards or cases of a kind they do not admit to their wards; of these, 107 died within the first twenty-four hours of admission. The following table shows in detail the numbers received from the ambulances of these several hospitals, together with the deaths within twenty-four hours which occurred among these admissions.

PATIENTS RECEIVED FROM OTHER HOSPITALS.

Hospital.	Admitted.	Deaths.
Harlem Hospital	287	4
Gouverneur Hospital	1,956	20
St. Vincent's Hospital	618	16
New York Hospital	473	4
Hudson Street Hospital	711	4
Presbyterian Hospital	772	11
Roosevelt Hospital	1,549	41
Flower Hospital	283	6
J. Hood Wright Hospital	59	1
German Hospital	19	0
Fordham Hospital	2	0
St. Luke's Hospital	12	0
Columbia Hospital	13	0
Total	6,754	107

The large number of ambulance cases delivered to us by other hospitals materially affects our death-rate, but we cannot escape this burden so long as they are authorized by law to impose it upon us. We append a comparative statement of the death-rate in this and other hospitals of this City.

MORTALITY REPORT.

Year.	Hospital.	Number of Patients.	Died.	Per cent.
1900	St. Luke's Hospital	2,370	338	14.21
1899	German Hospital	3,091		5.48
1900	Presbyterian Hospital	3,322	394	11.82
1899	Roosevelt Hospital	2,913	326	10.50
1900	Mt. Sinai Hospital	3,270		10.19
1900	New York Hospital	6,032	329	5.44
1900	Pennsylvania Hospital	4,079	394	10.12
1900	Massachusetts General Hospital	4,816	407	8.45
1900	Boston City Hospital	7,945	939	11.81
1900	Bellevue Hospital	24,300	1,722	7.08

Selecting from the above list the hospitals situated in New York City,[1] it is seen that, combined, they provide for a total of about 21,998 patients annually, with an average mortality of9.44 per cent.; whereas this Hospital provides for about 24,300 patients annually with a mortality of 7.08 per cent.

Recording Office.—We would also ask attention to the inadequacy of the accommodations to be found at the office set aside for keeping the records of administration of the Hospital. It is open to the same criticism that we bestow upon the other office; that is, it is badly lighted, poorly ventilated, crowded and noisy. The importance of these two bureaus in the conduct of any hospital is such that we trust they will not be lost sight of in the improvements contemplated.

Insane Pavilion.—Continuing our report, we consider next the Insane Pavilion. The medical service rendered here is of a mixed character. Questions of insanity are dealt with exclusively by two physicians who are paid by the City and are outside the jurisdiction of this Board; all other medical questions are under the control of this Board.

As has been stated elsewhere in this report, the House Staff, in addition to their duties in the general wards of the Hospital and Reception Office, are also responsible for the care of the patients in the Alcoholic Pavilion, the Emergency Hospital, the Erysipelas Pavilion, theTuberculosis Pavilion, and the Prison Wards. During the past nine months they have also been required to assume charge of the insane, a service which calls for special knowledge and experience such as the members of the House Staff cannot be expected to possess.

We, therefore, renew the recommendation made to you nine months ago by the Committee of Inspection, that the patients sent to the Pavilion for the Insane be placed under the charge of a competent, well-qualified physician, with suitable salary, who shall devote his time exclusively to their care. There should also be an Assistant Resident Physician so that the Pavilion may never be without the presence of a competent medical attendant. The Resident Physician should be held absolutely responsible for the condition of every patient.

Nursing Service in the Insane Pavilion—

	Number of Patients.	Died.	Per cent.
[1] City Hospitals	10,032	910	9.28
Metropolitan	4,542	383	8.43

The nursing service of the male ward of the Pavilion should be in the charge of a carefully selected, supervising graduate nurse, assisted by trained asylum attendants. In the opinion of the Committee, male pupil nurses are not fitted for the care of the insane. In this connection we refer you to the accompanying report of the President of the Board of Managers of the Mills Training School upon the conditions which have prevailed in that Institution.

Touching the nursing done in the female ward, it appears to have been as good as circumstances required—the result, no doubt, of the presence of a supervising graduate nurse, the system approximating in some degree that recommended for the male ward.

Alcoholic Wards.—Wards 32 and 34 of this Hospital are set aside for the reception and care of patients who, though not insane, are apt to be noisy and irresponsible, and who cannot be properly guarded in the general wards of the Hospital. Most of such cases are alcoholics, but some few are the victims of nervous disorders, such as certain forms of epilepsy and hysteria, in which phases of temporary mania may develop. These wards are the only places offered as a free refuge to patients of these several classes, coming from Manhattan Island and the Bronx. When it was opened the number of patients annually treated therein was about 3,000, the numbers now vary between 5,000 and 6,000 each year, nearly one-fourth the entire admission to the Hospital for the corresponding period. The space was adequate for the three thousand yearly admissions, but with the large increase it is often severely congested, so that not infrequently patients must sleep on mattresses placed on springs on the floor, the number of ordinary beds not being sufficient. This does no special harm and does not serve as an unbearable discomfort, but such crowding is not sanitary and not advisable, and would not be permitted if adequate accommodations were available.

The increase in the number of alcoholics is due to several causes: (1) The increase in population, which, however, is the least. (2) To the fact that, as always, most of the alcoholics of other hospitals are sent to Bellevue. (3) To the large number of cases of acute drunkenness which are brought in by their friends or by the police to sleep off their condition here rather than sleep it off at home or at the station house. (4) To the increased number of alcoholics who, finding themselves well cared for, come in again and again to be treated—go out and return. These repeaters vary in their attendance from two to three times a year to, as in one instance, forty times within nine months. This clearly is an imposition, but it is very difficult when a man is in a state of intoxication to determine promptly whether it is the only diseased state

which he presents, or whether some very serious condition may not be hidden beneath. It is, therefore, hazardous to refuse admission to cases of acute alcoholism. But in the opinion of the Committee, relief from this congestion may be obtained by securing a transfer to the workhouse of those who can be classed as habitual drunkards, as is shown by the following attempt to put this in practice.

In the six weeks beginning May 15th to July 1st past there were 462 male alcoholics and 161 female alcoholics; of these there were 60 males who were repeaters. A recommendation was therefore made by the Committee of Inspection to the Commissioner to the effect that a competent person be delegated to visit these wards daily, take out those who were repeaters, bring them before a magistrate and have them committed to the workhouse as habitual drunkards. This did not seem, in the opinion of the Commissioner, wise at that time. In order to test the efficacy of this plan in reducing the number of these repeaters, the Visiting Physician in attendance tried the method of threatening the above action to those who should come a second time. This was tried only in the male wards. The result was that during the following six weeks, from July 1st to August 15th, the number of admissions fell from 462 to 381 and the repeaters from 60 to 12. The admissions in the female ward were 181. Since that time, however, finding that this threat was not carried into effect, the number of admissions each month has gradually risen until during the six weeks from November 15, 1900, to January 1, 1901, it has gone up to 532 in the male wards alone.

Cases of Epilepsy, Etc.—Another cause of overcrowding in Wards 32 and 34 is the fact that they are the only places in the Hospital in which certain forms of epilepsy, hysteria and even surgical mania can be cared for. They cannot be treated in the general wards because they are not only disturbers of the peace but are sometimes dangerous to other patients or to themselves, requiring a degree of confinement and special care which cannot be secured there. Caring for such cases in wards to which alcoholics are assigned is an evil, but for the present it cannot be avoided in this institution, for the simple reason that there is no other place in which they can be provided for.

The Committee recommends that the members of the Visiting Staff exercise closer supervision of these wards than heretofore, and also suggests that the House Physician and Senior be assigned to the duty of these wards, rather than Junior, as has been the case in one instance, as the latter's experience has hardly been sufficient to entrust him with such responsibilities as must face one in these wards.

We refer to the report made by the Managers of the Mills Training School for particulars concerning the nursing in these male wards. In the female ward, as in the Insane Wards, it appears to have been as good as circumstances permitted.

Other Wards of the Hospital.—The general wards of the main Hospital Building are clean, and, considering the style of architecture, comfortable, so that in the matter of quarters the patients are well provided for. We do not mean to state by this that these quarters cannot be improved, but viewed in comparison with other portions of the building, notably such as are set aside for those concerned in the conduct and administration of its affairs, they are in excellent condition. The several pavilions standing on the grounds are very creditable, excepting those recently completed, such as the pavilion for erysipelas patients and the one for tuberculosis. Serious errors in design and construction exist in both, but they will no doubt fill passably well the purposes for which they were constructed.

The Marquand Pavilion, and its superstructure, continues to serve the excellent purpose for which it was erected, but here, as well as in other parts of the Hospital, we see the need for repairs so as to keep it in proper order and protect it from the ordinary wear and tear of exposure and use.

The Emergency Hospital.—The building outside the Hospital grounds used for lying-in cases is so utterly unfit for the purpose that your Committee can only condemn it in every particular. We are glad to report, however, that plans are in preparation by the Commissioner for converting a part of the building on these grounds, formerly used as a Medical College, into a suitable place for such cases.

The Dispensary.—The Dispensary has always been one of the greatest problems in the management of the Hospital. During 1900, 72,239 new patients were treated and 176,647 visits by patients, old and new, were received at this Dispensary. At the present time there is no direct supervision except of the most casual kind. Those left in charge are unfit to be in such a position and there is a general laxity of discipline and a non-observance of all rules that make it a jumble of good and bad service. It can best be described as being in a state of vicious decay, and only the most radical measures can keep it from being a discredit to the institution. It is essential that a paid Superintendent should be appointed who can remain on duty while the Dispensary is open and who can see that there is a proper distribution of patients, that there is an orderly condition of affairs in the Dispensary, and that the medical and other appointees attend to their work at the hours assigned and also be ready to decide the incessant petty disputes which continually arise; who can also see that the pilfering of bandages, drugs and instruments be made to cease, and the responsibiliy for such actions be placed where it belongs and instant suspen-

sion from duty be meted out to the wrong-doer.

The present method of the Superintendent of the Hospital making the rounds of the Dispensary for a few minutes at a time, in addition to all the other duties that he has to perform, is worse than useless for the proper administering of such an institution. A deputy or some one responsible to him for the care and conduct of the Dispensary, and who has absolute authority over those under him—subject to the approval of his superiors—is the only method that can bring anything like order out of the chaos that now exists. Your Committee speak thus positively on this subject for this method was tried a few years ago with great success.

Food.—We find that there is a lack of food of the right kind for patients recovering from severe illness. The very sick are provided for by the milk which is furnished in sufficient amount, but there is no adequate provision for the stages of convalescence, for the transition from a milk to a full diet. This can be made by increasing the *pro rata* allowance for the table, but in order to place it upon the right footing, we would suggest that a special Committee be appointed to inquire into the subject so as to fix the dietary as nearly as possible upon the same plane as was adopted by the Hospital in 1890.

Nurses.—In view of the criticisms which have recently been made of the Hospital, particularly of the nurses, this is a proper place at which to report upon that branch of the service. Outside the two pavilions, the Insane and the Alcoholic, it has been found satisfactory. This applies especially to the female nurses. For a time there was some strain owing to a deficiency in the supply of nurses of all kinds, male and female. This was most apparent in the night service throughout the hospital—including the Insane and Alcoholic Pavilions—contributing, no doubt, to the state of affairs which existed in these latter wards. The supply of nurses has, however, been recently increased so that no slackness or neglect can find excuse. With an adequate force of nurses on duty day and night, the Committee feels that this service is now upon a proper footing. One night nurse for each ward has been allowed, except in the Insane Wards, where three are recommended for night duty and four for day duty. The force of nurses in the Alcoholic Wards is also to be increased. The day nurses throughout the Hospital can be maintained at the present number, with additions in two or three of the male wards and perhaps one of the female wards. In order to facilitate the work of the male nurses, it is suggested that an Assistant Superintendent of nurses be nominated by the Managers of the Mills Training School, for each Medical and Surgical Division of the Hospital, and that the Commissioner be requested to sanction this arrangement.

The arrangement for the selection, instruction and discipline of the nurses which has heretofore existed, has led unintentionally to a division of responsibility in the government and control under which they work. In order to secure and develop the best material in both schools it is necessary that their fitness for the work and for the diploma of the school should be accurately determined. This compels the close supervision of a Superintendent of Nurses, one for each school, male and female, and necessitates instructors and examiners all under the direction of the Boards of Management of the two Training Schools. The bearing of this admirable system upon the nurses is unquestionably most excellent, but we suggest that, while the duties of those who supervise the nurses from the time of their admission to their departure from the school, be in no way curtailed, the Superintendent of the Hospital, as representing the disciplinary head of the institution as a whole, be placed in such control as will establish a more direct and short line of responsibility between himself and the nurses on duty than now prevails. The system of night reports which the present Superintendent has established, would appear to be an easy way of bringing this about, but he should have the right to suspend at once any nurse for cause. This need not interfere with the line of responsibility which runs from the nurse through the Superintendent of each School to the Superintendent of the Hospital, but it enables the Superintendent of the Hospital to act directly himself, in cases of conflict of opinion with these Superintendents, for his own judgment should dictate the proper conduct of the entire force of the institution under his control.

The Employees and Their Quarters.—The Committee now asks your attention to the problem presented in the character of some of the paid employees of the Hospital; many of whom are frequent inmates of the Alcoholic Pavilion. Those termed "help," who perform the menial service, are utterly worthless as a class. The reason for this is two fold, (1) insufficient pay; (2) unsanitary, poorly lighted, badly ventilated, crowded, and at times, dirty quarters. Quoting the report of the member of the Committee who gave special attention to this subject, we find that: "The dormitories for the male help are on the lower or ground floor. All these rooms are poorly lighted, with but few windows, and the ventilation is absolutely inadequate to the number of beds that have been crowded into them. The number of cubic feet of air to each occupant is far below what should be permitted.

Taking then in order: In the men's dormitory between the two prison wards, there are eighteen beds and the occupant of each bed has

been granted but about 480 cubic feet of air. And in the old alcoholic cells under Ward 29 the occupants have, in some instances, a little more air—about 1,000 cubic feet in some cases—but in others the amount varies from 500 to 300 cubic feet for each bed. The care of the rooms, beds and bedding has been left to some caretaker, who, so long as the external appearances were not too gross, allowed things to move pretty much as chance dictated. Proper care of the cleanliness and condition of these dormitories by those having authority over the housekeeping does not seem to have been exercised. The conditions are such that they violate several laws laid down by the Sanitary Code of the Health Department. Living under these conditions, it is small wonder these individuals add further to the discomfort of their fellows by frequently going in at night drunk and disorderly and increasing the disagreeable features of the place.

In one dormitory the caretaker had had tuberculosis for several years, and careful examination by members of the Medical Staff has shown that five out of seventeen of the inhabitants of this place have acquired tuberculosis since forced to live there; it is all the more striking that those who have acquired this disease are among those who have lived there the longest.

The dormitories for women are kept in a little cleaner condition than are those for the men. The dormitory over the Alcoholic Wards is better than the others because of the high gable of the roof, but its forty-seven beds are so crowded together that a generous estimate of the air space is but 500 cubic feet to each bed.

The help sleeping in these female dormitories under these conditions must necessarily be of a poor order; and here also drunken disorders and fights at night add to the discouragement of having any decent help in the Hospital.

The principle which has been insisted upon during the administration of the present Commissioner—that there should be paid help and thus responsible help about the Hospital—is the only right standard, but if the existing conditions of living in the cells and cellars of the Hospital or huddled together in large numbers prevails, it will be impossible to attain it. Proper help cannot be secured until these conditions are remedied, and at least a decent state of living is guaranteed to those who go there to work for their livelihood.

The present necessity which the Commissioner is under of utilizing as a dormitory the large dissecting-room in the building, used up to the present year as a medical college, but accentuates the above statement and shows the straits to which he is reduced in his endeavor to meet the absolute needs of this situation.

The class of employees engaged in the duties of stretcher bearers, who carry patients too ill to walk to and from the wards, is on a par for efficiency with the paid help, and largely from the same cause—those engaged as messengers, as attendants at the telephone, in the store-room, the laundry—and some of those doing clerical work are too often sufferers from some chronic ailment which makes it impossible for them to render proper service.

Question of Nurses.—Continuing our report upon the accommodations furnished those who are concerned in the service of the Hospital, we come next to those provided for the nurses. These are situated in the Mills Building and the Building of the New York Training School for Nurses, this latter being outside of the Hospital grounds and entirely independent of it and supported in part by a private fund furnished by its Board of Trustees. These two fine buildings, the gifts of private citizens, furnish adequate accommodations up to the present time. The increased number of nurses which our necessity demands, will however require a corresponding increase in these accommodations, otherwise conditions will speedily prevail in the quarters of the nurses which have proved such a serious drawback in the case of the resident House Staff of the Hospital, a matter of which we will now speak.

Quarters of House Staff.—In presenting the conditions which prevail in the accommodations provided for the House Staff, this all-important factor in the administration of any hospital, we desire to call your attention to the following:

The duties devolving upon the Staff of the several Divisions, medical and surgical, are greater and more complex than in any other hospital in the City. The service in the 32 wards of the main Hospital is at all times active. In addition the following services outside of the general wards are dependent for their proper care and supervision upon this same corps: Service in the Reception Office, in the Male and Female Prison Wards, in the Alcoholic Wards, in the Insane Pavilion, in the Emergency Lying-in Hospital, in the Tuberculosis Pavilion, in the Erysipelas Pavilion, together with ambulance calls, of which there were 4,616 during the year just ended.

The number of physicians and surgeons required for these extended duties is much greater than can be accommodated in the quarters available, so that in most of the rooms occupied by them as many as three must live continuously. The excess sleep in quarters which they provide for themselves outside of the Hospital grounds. During the day often late at night, they are at work in the Hospital, and of necessity must be accommodated in some measure somewhere; this can only be found in the already over-crowded rooms of their associates, hence it is that from five to six of these young men are not infre-

quently compelled to use one room in the intervals of their ward and other duties. The general sitting-room on the office floor is supposed to furnish this sort of accommodation for the Staff, but is used for so many different purposes that it is frequently not available.

A bare statement of this condition would seem to be sufficient to condemn it, but when we look further and realize that with three men sleeping in one room, and that in the discharge of their regular duties each is liable to be called up at least once during the night, making not infrequently as many as three interruptions a night for the entire room, the disadvantages are obvious. Add to this the impossibility of securing quiet in the face of the coming and going of five or six men who frequent the room during the day, and it appears that sufficient sleep is not always obtainable. This is a state of affairs incompatible with the highest grade of work in the extremely exacting position in which these men are placed. The sanitary condition of these quarters is only fair, the degree of cleanliness is what it should be, and as a whole, they are not what a great city should provide for men in its service who, without pay, are constantly facing the grave emergencies which a fight for the health, efficiency and life of its charges constantly present.

Conclusion.—We are of the opinion that the rules and regulations of the Hospital are correct upon the whole, that the various divisions and subdivisions of the force which is concerned in its administration are, as far as circumstances permit, organized upon correct lines. A division of authority has, however, existed which has been responsible for the defective execution of the laws under which the Hospital was supposed to live. This, as we stated to the Commissioner, some time ago, can be obviated by a head which places itself in contact with these various subdivisions and exercises immediate and vigorous control over all. We are glad to say he has accomplished this by installing Dr. Stewart.

But permanent improvement is rendered difficult and, some of us believe, impossible in the face of the inefficiency of the paid employees as a class, and the wretched accommodations furnished to so large a portion of your Staff, doctors and employees alike. Correct this and raise the *per capita* allowance of this Hospital to a figure approximating that which obtains in like institutions in this city and the crying evils will be permanently eradicated. Otherwise the outcome of this effort at improvement will end as the many which have preceded it. Decent service requires fair pay and decent accommodations. To which end we earnestly recommend an increase in the *per capita* allowance and also that the main Hospital building should be replaced at once by a modern and more commodious structure.

We beg to call your attention to the following comparative statement of the *per capita* allowance in this and other leading hospitals.

PER CAPITA COST PER DIEM FOR WARD PATIENTS.

St. Luke's Hospital	$1.82
Presbyterian Hospital	2.44
Roosevelt Hospital	2.195
Mt. Sinai Hospital (new hospital)	1.38 3/6
New York Hospital	2.08
Pennsylvania Hospital (Difference in cost between N. Y. and Phila.)	1.17
Massachusetts General Hospital (Difference in cost between N. Y. and Boston)	1.96
Boston City Hospital	1.77
Bellevue Hospital	1.21

Selecting for comparison the five hospitals in the above list situated in New York City, it is seen that the average *per capita* allowance provided for each patient is $1.98, as against $1.21 for Bellevue Hospital; a statement all the more worthy of official consideration when we compare the commodious and well equipped quarters, in which their patients (18,907 in all) are cared for, with those at Bellevue Hospital in which we care for the 24,300 patients which fall to our lot.

WM. M. POLK, Chairman,
A. A. SMITH,
GEO. B. FOWLER,
ALEXANDER LAMBERT,
JOHN W. BRANNAN.

ORIGINAL ARTICLES.

VACCINATION, CLINICALLY CONSIDERED.[1]

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IT would be quite impossible in a paper of reasonable length to discuss exhaustively the clinical aspects of vaccination. I shall therefore wholly omit reference to some phases of the subject, and deal very briefly with others. Even so, I fear I shall tax your patience.

Clinical Course of the Normal Vaccinal Eruption.

The following description applies to primary cases vaccinated with virus of *high grade* efficiency.

Period of Incubation.—This lasts two or three days. Immediately after vaccination a small area of redness appears around the scarified spot. This subsides in a few hours. At the end of forty-eight to seventy-two hours; the second stage begins as a *papule*, which exists by itself for one or two days. The *vesicle* begins to develop by the end of the third or fourth day. Its first appearance and manner of growth vary according to the method used in performing the vaccination. If the virus has been introduced by *puncture*, the vesicle first shows at the site of puncture minute in size and quite round. Within a day or two it has became distinctly umbili-

[1] Read before the Section on Pediatrics of the New York Academy of Medicine, February 14, 1901.

cated, and is well raised above the surface of the skin. It increases in size until it reaches a diameter of $^3/_{16}$ to ¼ inch, and is rarely more than ⅓ inch in diameter.

When the scarification method has been employed, vesiculation begins at one or frequently at two or three points around the edge of the scarified area. The vesicle then spreads until it forms a ring. If the scarified area has been of considerable size, the center is not covered by the vesicle, but is occupied by a depressed crust, which corresponds to the umbilication in a vesicle resulting from puncture. If the scarified area has been small, the vesicle will occupy this whole area, and will bear a small crust upon its somewhat depressed center. In either event, the greatest evidence of the process which finally results in the well-known scar is at the periphery of a ring-shaped vesicle; and it is by peripheral extension and the consequent broadening of this ring that the vesicle increases in size.

The shape of the vesicle depends upon that of the original scarification. If the latter is square the vesicle will be round; if oblong, it will be more or less regularly elliptical. When the virus has been inserted along double lines of scarification, small vesicles will appear along these lines; these will coalesce as the process advances, and the final result will be a compound vesicle of somewhat irregular outline.

When fully developed, about the sixth day after vaccination, the vesicle is of a pearly color, and is well distended, its edge rising abruptly from the papular base upon which it lies. Upon opening the vesicle, it is found to be composed of numerous cellular spaces, separated from one another by delicate walls, and containing a clear, very pale lymph.

Areola and Pustule.—On the seventh or eighth day, as a rule, the so-called areola appears. The skin around the vesicle becomes red and hot, for a variable distance, with a painful induration of the subcutaneous tissue. The erythema is often more extensive than the induration. The size of the areola and the extent of induration are very variable, but as a rule the circumference is not more than two inches from the edge of the vesicle. The color of the areola should be deep pink or bright red. Within a day or two after the first appearance of the areola, the vesicle changes to the so-called "pustule." If very pure virus has been used, this at first is often not true pustulation; the vesicle simply loses its translucent look, and becomes opaque, with perhaps a slight yellowish cast. Beneath the central crust there is a drop of pus, such as underlies the scab of any encrusted sore, but the contents of the vesicle are still serous, though the serum may be slightly turbid and contain a few leucocytes. If the vesicle contains bright yellow or greenish pus on the seventh day it may be considered infected. When the areola is at its height on the ninth to the twelfth day the adjacent lymph-nodes often become somewhat swollen and painful.

The formation of the areola and the pustulation are attended by a constitutional disturbance which varies according to personal idiosyncrasy, but which is usually proportionate to the extent and severity of the local inflammation. There is elevation of temperature, the child complains of itching and pain, and is restless and irritable, especially at night. There may be anorexia and more or less prostration. If there has been no septic infection, these symptoms are usually moderate, and subside in a few days—three days to a week. Some children escape them almost entirely. The pustule gradually increases in size, reaching its maximum from the eleventh to the thirteenth day; at this time its diameter is from ⅛ to $^3/_{16}$ inch greater than that of the vesicle just before pustulation.

Desiccation and Cicatrization.—Sometimes the contents of the vesicle begin to dry up by the ninth or tenth day; usually, however, they turn to pus. Then, about the eleventh or twelfth day the areola begins to fade, the constitutional symptoms to subside, and the pustule to desiccate. A hard, dark scab is formed, which is shed from the eighteenth to the twenty-fifth day (oftenest about the twenty-first), leaving a pit-shaped depression. Upon this area a secondary scab often forms to be shed a few days later.

As regards constitutional symptoms, we may, roughly speaking, divide the vaccinal course into three periods of one week each: (1) A mild week of invasion and vesiculation, before the appearance of the areola; (2) a severe week during the existence of the areola, the swelling and the pustulation; throughout this period, pain, fever, anorexia, restlessness and irritability are likely to be marked; (3) a mild week, beginning with the fading of the areola, and the desiccation of the pustule, and ending with the shedding of the scab. During this week the constitutional symptoms subside *pari passu* with the subsidence of the local inflammation.

Variations in the Normal Clinical Course.

Early and Delayed Vesiculation.—Rarely the vesicle will appear on the second day. It is much more commonly delayed until the fourth, fifth, sixth, seventh, or even the eighth day, the subsequent history being apparently normal. Note is made of three primary cases observed by the vaccinators of the Health Department in which there was no vesiculation on the eighth day, and the cases were supposed to be failures; yet, at the end of ten days to two weeks, typical vesicles developed, which ran through the usual course and left typical scars. One of the cases mentioned was one of five test cases inoculated with a partic-

ular virus. The other four patients took well and ran through the customary course, while the fifth met with the delay above mentioned. In general, however, late vesiculation means virus of impaired activity.

Variations in Areola and Constitutional Symptoms.—The most notable variations that may be said to come fairly within the limits of a normal course are observed in the amount of areolar inflammation and in the intensity of the constitutional symptoms. A normal, uncomplicated vaccinia may run a mild or a severe course, just as does scarlatina, measles, varicella or variola.

If the vesicle is typical in appearance, and the areola, even if large and much indurated, is only a bright red, the condition may be regarded as normal, although severe; but if the vesicle is irregular in shape and hemorrhagic, or filled with very yellow or greenish pus and covered with a dirty looking crust, and if, moreover, the areola is of a livid purple near the edge of the pustule and dark red for a considerable distance away from it, the case is probably one of mixed infection. There is a sinister look about these infected cases which is quite characteristic. Cases in which the arm has been carefully cleansed before inoculation, and in which pains have been taken to prevent infection and to preserve the vesicle intact, present large and dark areolæ much less frequently than those in which such precautions are not taken. It is therefore fair to assume that such an areola is caused by infection other than pure vaccine infection. This extraneous infection may, of course, be due to impure virus or may be introduced from without at the time of vaccination or afterward.

Modifying Effects of General Ill Health, Skin Diseases, Hot Weather and Diarrhea.—Ill-nourished, bottle-fed and marasmic babies often respond atypically, or not at all to a virus which gives perfect results in healthy children. It is said that vaccination often fails to take typically in children affected with skin eruptions, especially eczema, but in the few eczematous children which I have vaccinated the disease has not appeared to modify the ordinary vaccinal course. It is also asserted that vaccination often fails when performed in hot weather, or upon children suffering from diarrhea. I have vaccinated many children on extremely hot days. Some had diarrhea at the time of inoculation and others developed it during the evolution of the pock, but neither the heat nor the diarrhea had apparently any influence in preventing the development of typical vesicles.

Raspberry Excrescence and Its Protective Power.—Quite frequently, when virus of a low grade of activity has been used, no vesicle develops, but there appears, instead, a hard, elevated excrescence, grossly resembling keloid, and in color like a fully ripe red raspberry. This elevation is not sensitive, no areola develops, no constitutional symptoms appear, and there is no evolution beyond that of the excrescence itself. This persists for some time, but is finally absorbed and disappears entirely, leaving no scar. The significance of this excrescence and its protective power are disputed points. Some hold it to be an abortive take, and claim for it some slight protective value, while others maintain that it affords no protection whatever. A certain number of such cases have been revaccinated as soon as the raspberry has been formed. In most of these the second vaccination has been successful. Sometimes typical vesicles have resulted, but more often the cases have run the course of a secondary vaccination instead of the typical course expected in true primary cases. In a few instances, repeated attempts to vaccinate have failed entirely, although virus was used which had resulted typically in all other cases tried. From these facts, the inference may be drawn that in some cases the raspberry excrescence does afford slight protection, at least against immediate revaccination. Occasionally raspberry marks and typical vesicles develop side by side, and sometimes a vesicle develops upon a raspberry base; but in the latter case the vesicle usually runs an abortive course. A raspberry excrescence is an evidence of poor virus. I have not seen one develop in a case of primary vaccination for two or three years.

Abortive Course.—In this, the vesicle appears early or late and never reaches full development; pustulation takes place early, and cicatrization follows before the end of the second week. This course is normal, although not invariable, in all vaccinations after the first. When it is observed in a supposed primary case, careful questioning usually elicits the fact that vaccination has been attempted before, but was supposed to have been a complete failure. A close examination of the arm will, however, usually discover a faint scar. If a true primary case runs an abortive course after vaccination with virus of unimpeachable quality, and if conditions such as seriously-impaired general health, or skin disease, which might possibly modify the course of the vaccination do not exist, it may be inferred that the individual is partially immune.

Complete Natural Immunity to Vaccination.—This is practically unknown, and those who have seen most vaccinations are least inclined to admit the possibility of its existence. The testimony of the vaccinators of the Health Department of this city, who have in some cases had an experience lasting over tens of years, and embracing hundreds of thousands of vaccinations, is that instances of complete natural immunity are extremely rare. The medical officer of the Local Government Board in England says that "from reports received from the Board's own vaccinators, covering a period of some fifteen years, and having concern

with no less than 95,677 consecutive primary vaccinations, it has been shown that no single case of insusceptibility has been met." There have been, however, during the century, many cases reported which have shown, to say the least, a remarkably refractory condition toward vaccination. In 1825 Spurgin reported three children as insusceptible to vaccination, and also insusceptible to variola with which he subsequently inoculated them.

I have seen one case which I was convinced was one of true idiopathic immunity. This was in the person of a physician of this city, who had been vaccinated many times, but always with absolutely no result. At one time during a considerable period he came frequently in contact with smallpox, but never contracted the disease. The most minute inspection of his arms, where all his vaccinations had been performed, failed to discover that any one of them had left the slightest mark. During the winter of 1895-96 I vaccinated him twice with two different specimens of Health Department glycerinated virus, both of which I had proved, by rigorous tests upon children, to be of more than usual activity. Both attempts were complete failures. In September, 1896, I made another attempt with unimpeachable virus. This also failed.

A curious case is now recovering from smallpox at North Brother's Island. The patient, a negro, was for many years a private in the United States Army. He had been vaccinated time after time by army surgeons at different posts, always without effect. He presented no scar. Recently he contracted smallpox which ran a severe course with a profuse, discrete eruption. Unfortunately, we are not certain of the efficiency of the virus used upon him; but it is to be inferred that his reputation as an immune would have led some of the surgeons who vaccinated him to be certain upon this point.

The Scar.

For several months after vaccination the normal scar is red and is usually depressed. Gradually it loses color, but is pinkish in the center for a year or more. Its final appearance in typical cases is as follows: In color it is whiter than the surrounding skin, the outline is quite regular, the edge sharply defined, and the entire area is slightly depressed, the center is smooth or somewhat striated, and is surrounded by a more or less deeply and numerously foveated ring. This ring corresponds to the area of active vesiculation; while the center represents either the original area of scarification, or the cicatrix following the separation of a more or less deep central slough. The shape of the scar depends upon the shape of the original scarification, while its size depends partly upon the size of the scarification, and partly upon the activity of the virus.

A poor scar is irregular in outline, with an ill-defined margin, no depression and with little or no foveation. Sometimes the scar is "poor" even when the vaccination has been a well-marked and typical course, but as a rule a good vaccination gives a good scar.

Complications.

Skin Eruptions, Infections, Generalized Vaccinia, Etc.—A monograph would be required to describe adequately all the complications which have been observed to follow in the train of vaccination.

In the old days of humanized virus, there was real danger of transmitting syphilis, and possibly tuberculosis. Now that bovine virus is almost exclusively used, the bugbear of invaccinated syphilis has disappeared. The possibility of inoculating tuberculosis is also extremely remote. Most of the vaccine laboratories now propagate their virus upon calves. Villain, chief of Meat Inspection in Paris, asserts that he has never seen a tuberculous calf between the ages of four and six months, among the 753,851 calves of this age killed in the abattoir during the years 1888-89-90. The calves used in the vaccine laboratory of the Health Department of this city, carefully selected in the first place, are killed immediately after the collection of the virus, and their organs carefully examined by a veterinarian for evidences of disease, with the idea of rejecting the virus if disease is found. For several years, to my certain knowledge, no virus has been rejected because of tuberculosis in the animal. The inoculation of syphilis or tuberculosis, then, need no longer be feared.

Allbutt, in his System of Medicine, gives an elaborate classification of the rashes and infections which may complicate the course of vaccinia. I have space to mention only a few of those most frequently seen.

SKIN ERUPTIONS.—These usually develop about the time the areola appears, but may develop earlier. By far the most frequent of these is a *roseolous rash* which often quite closely resembles measles or the eruption which so frequently follows the injection of diphtheria antitoxin. The roseolous patches, small or large, may be distributed over most of the body. In some instances the eruption seems entirely non-inflammatory, and is attended by little or no itching or constitutional disturbance. In other cases itching is severe. In either event the rash subsides in two to four days without treatment.

Erythema Multiforme.—Another fairly common rash follows some one of the types of erythema multiforme. For instance, there will be a more or less general distribution of erythematous patches, ¼ to ¾ inch in diameter, with a small vesicle in the center of each patch. There is considerable itching, the vesicle is soon destroyed by scratching, and a bloody crust is formed which promptly dries up. The patch fades, leaving a faint pigmen-

tation which persists for some time. The eruption may be attended by moderate constitutional symptoms.

Scarlatiniform Rash.—This sometimes appears and may present a very perplexing problem in diagnosis. In a recent private case of my own such a rash appeared on the fifth day after vaccination. The child had a little fever and the tongue and throat were red. Neither the diagnostician of the Health Department nor myself could make a positive diagnosis. The rash disappeared within twenty-four hours, as it often does in mild scarlatina. Desquamation did not take place, and it was only upon this feature, after a ten days' quarantine, that the diagnosis of scarlatina could be finally excluded.

Eczema.—It is asserted that vaccination is often followed by an outbreak of eczema, especially in a person who has had this disease at some previous time; and that, as a rule, an eczema existing at the time of vaccination is made distinctly worse. I have vaccinated numerous eczematous children, but have not observed that the disease was thereby aggravated; nor have I observed the lighting up of an old eczema which at the time of vaccination was inactive.

It is also held that there is danger of causing generalized vaccinia by auto-inoculation over the eczematous area, but this must be of rare occurrence, for at the Hôpital Saint Louis in Paris, for several years, all the dermatological cases were vaccinated, and yet only one case of generalized vaccinia appeared.

INFECTIONS.—*Septicemia* of virulent and even fatal type has been observed, though rarely. Many of the cases reported have occurred in groups, following the use of particular specimens of humanized virus.

Cellulitis, or Dermato-Cellulitis.—Some degree of localized septic infection is the commonest of all the complications. This may be of any grade of severity, from an inflammation which is scarcely more intense than that seen in a severe normal case, up to the most virulent form of gangrenous cellulitis, with suppuration of the adjacent lymph-nodes and grave constitutional disturbance. Fortunately, very few cases pass beyond the stage of a moderate cellulitis, with some sloughing at the site of the vesicle, and a more or less marked non-suppurative axillary (or inguinal), adenitis. Such cases demand, and usually respond kindly to treatment upon general surgical principles. I have seen only two cases of suppurative adenitis.

Erysipelas.—This is said to be a fairly frequent complication. The dividing line between this disease and cellulitis is a very indefinite one, both bacteriologically and clinically, and it is sometimes difficult to decide whether a particular case is one of erysipelas or of local dermatitis and cellulitis due to ordinary pyogenic infection. The classical distinctive features of erysipelas are as follows: The inflammation extends widely and rapidly, and is most intense at its spreading edge; vesicles form on the surface of the affected skin; resolution takes place just at the point first attacked, and is attended by considerable desquamation. If only such classical symptoms be regarded as erysipelas, I have observed no instances of this disease after vaccination. The brilliant blush upon the skin which is seen in many cases of infected vaccination, frequently suggests erysipelas, but in these cases the inflammation does not extend very rapidly or very widely; it almost never goes beyond the affected limb; it is most intense in the immediate vicinity of the vesicle, and continues to be most intense there; vesicles do not form upon the skin, except perhaps a few in the immediate vicinity of the vaccinated spot; resolution takes place first at the periphery of the inflamed area, and last at the point first attacked, and is not attended by desquamation. True erysipelas complicating vaccination is certainly rare at the present day.

Impetigo Contagiosa.—Sometimes this occurs as a complication. Two cases observed by the writer were already well developed on the sixth day after vaccination. In one, a lesion of impetigo was situated at the site of each of the three inoculated spots, and there was a patch of the disease on the back of the infant's neck. In the other infant, the eruption was confined to the lower part of the back, and may have been only a coincidence, although no skin lesions had existed before vaccination. Constitutional symptoms were insignificant in each case. The same virus was used on both children. In no other cases vaccinated with this virus did impetigo or any other eruption appear.

Tetanus.—This is a rare complication. Huddleston, in an examination of the literature found only 12 cases, 11 of which were fatal in periods varying from three to fifteen days.

Delayed Healing After Shedding of Scab.—In some infected cases, and also in some which have run an apparently normal course, an indolent ulcer follows the shedding of the scab, or the spot is covered with flabby exuberant granulations. Untreated, these cases often remain unhealed for months. Frequently these spots heal temporarily, but the cicatrix is of such low vitality that it breaks down repeatedly, and the case may go on for months alternately healing and breaking down, unless appropriately treated by the physician.

Generalized Vaccinia.—By this is meant, not the appearance of a few supernumerary vesicles near the site of vaccination, but an eruption passing through the successive stages of papule, vesicle and pustule, which comes on within a few days after vaccination, and which is diffused more or less extensively over the body.

The cause of generalized vaccinia is disputed.

Some authors claim that every case is an auto-inoculation, and certainly, in many instances, this is an adequate explanation of the presence of the additional lesions. Five such cases have come under my own observation. In one case, two vesicles appeared side by side just above the wrist of the vaccinated arm. The child had gotten some of the blood and vaccine mixture upon her right hand, and had rubbed it upon her left wrist. The mother had wiped the wrist with a cloth but had not washed it. The extra vesicles were as far advanced when inspected as the original ones. This was an unquestionable case of auto-inoculation. In another case the struggling child was accidentally pricked upon the back of the hand with the still-charged lancet immediately after vaccination. In spite of washing a vesicle developed. In a third case, a vesicle developed upon the cheek on the same side as the vaccinated arm, due, doubtless, either to infection by means of the finger-nails, or to actual contact of the cheek with the vaccinated spot. In the fourth case, four vesicles appeared; one on the left forearm (the vaccinated side), one on the right forearm, one on the right upper arm, and one on the left thigh. This was on the seventh or eighth day after vaccination, when the original vesicle was already well developed and surrounded by an areola. The new vesicles were soon broken by scratching, and their progress, therefore, could not be accurately followed, but they seemed to run the short course of a secondary vaccination. No positive history of auto-inoculation could be obtained in this case, but as the child could easily have infected himself without the knowledge of his parents, and as the lesions could easily be explained on the auto-inoculation theory, there would seem to be no reason for postulating a systemic infection. Inspection of this case six months after vaccination showed rather poorly marked scars at the sites of the supernumerary vesicles.

The fifth case was clearly one of auto-inoculation. The child scratched its arm, and rubbed its eyelid with the infected fingers. As a result there developed three vesicles, one on the upper lid and two on the lower, just where their edges came together in closing the eyes.

Cases of true generalized vaccinia, however, do occur. Chauveau produced the condition experimentally by injecting virus into a lymphatic.

Huddleston has collected, from the literature, 45 cases of generalized vaccinia with 7 deaths. Of these cases, 12 could reasonably be explained on the theory of auto-inoculation, and in 13 more such a cause was possible, though not probable. In the remaining 20 cases, no such cause could be reasonably claimed, and a diffusion of the virus by the blood or lymph channels was apparently a necessary explanation.

The diagnosis of generalized vaccinia, usually easy, may be difficult. Varicella, miliaria, or a simple vaccination rash of vesicular type may present characters which strongly resemble generalized vaccinia. In such a case the doubt may be removed by taking lymph from a vesicle at a distance from the site of vaccination, and inoculating another subject with it. If the case is one of generalized vaccinia, a true vaccine vesicle will of course, develop.

Immunity Conferred by Vaccination to Smallpox and Revaccination.

Immunity to revaccination or to smallpox through the medium of vaccination is acquired rather slowly. Repeated experiments by vaccinating a subject daily until the vaccination fails to take have shown that immunity is secured usually in from seven to ten days, more rarely not until a few days later.

The incubation period of smallpox varies, but is usually eleven to fifteen days. If a person is vaccinated on the day of exposure, or even on the next day, he is likely to escape the disease altogether, but may have varioloid. In case smallpox develops during the evolution of the vaccine pock, the following facts are likely to be observed: If the smallpox eruption appears before the vaccination has reached the stage of areola (eight to ten days), the disease will not be much modified, but the vaccination vesicle will quickly dry after the disappearance of the eruption—in other words, the smallpox will modify the vaccination. If the vaccination has reached the stage of fully developed areola by the time the smallpox eruption appears, the disease will be mild, and evidently modified by the vaccination.

Immunity Is Not Interfered With by the Destruction of the Vaccine Vesicle.—Bosquet proved this by the following experiment: on the fourth day after vaccination, he destroyed with the lancet and with nitrate of silver the papules which had begun to be visible, but immunization occurred just the same as if the vaccinal eruption had been allowed to follow its normal course.

Aimé Martin destroyed the skin with Vienna paste at the point of inoculation before the appearance of any papule, and subsequent inoculations showed that immunity had already been acquired. In cows, Maurice Raynaud excised discs of skin including the points of inoculation, twenty-six hours after the operation. There was no trace of a cutaneous eruption, but the animals were immune to revaccination two weeks later. In the laboratory of the Health Department of this city it was found that in calves immunity was not secured unless two days were allowed to elapse before the excision was practised; but all experimenters agree that after the vesicle has appeared, its destruction does not prevent immunity. Chauveau found that the injection of vaccine virus into the lymphatics or veins caused a general eruption with resulting immunity, without, if proper precautions were taken, the development of the local lesion at the point of injection.

The local lesion, then, is not requisite in

order that the immunizing substance, whatever it is, may be produced in the system. I emphasize this point, because many physicians hesitate to open and cleanse an infected vaccine vesicle for fear this measure may lessen the degree of protection afforded by the vaccination.

The mechanism of immunity is still unexplained. We only know that the infusion of serum from vaccinated animals, during the stage of eruption into unvaccinated animals, has shown that the vaccinogenous substance is present in the blood during this stage. It is there, however, in comparatively small proportion, since it is necessary to infuse large amounts, nearly $^1/_{100}$ of the body weight, in order to secure immunity to subsequent vaccination.

Effect Upon the Fetus of Vaccination or Smallpox in the Mother.—Little or no immunity is given the fetus by vaccinating the mother. Wolf vaccinated 17, and Gast vaccinated 16 women in various stages of pregnancy, and subsequently vaccinated the children with complete success. Behm, after successfully vaccinating 63 pregnant women, found 12 of the children refractory to the first vaccination, and of these 12, two were afterwards successfully vaccinated, one in the second month, and one at the end of a year. Dubiquet obtained 44 "takes" in 50 cases of new born children, whose mothers had been successfully vaccinated during pregnancy.

Variola in the pregnant woman does not confer immunity upon the child. In fact the fetus *in utero* may be attacked and the child be born with the active eruption, or with the scars of the completed disease.

Children born while the mother has smallpox usually contract the disease. If the mother is in the early stage of the disease at the time the child is born and if the infant is vaccinated at once it *may* escape. As a rule, however, a portion of the incubation period has elapsed before birth, so that the eruption appears before immunity can be secured by vaccination and the infant dies of the disease.

Duration of Immunity Conferred by Vaccination.—The duration of immunity, both to smallpox and to revaccination, is extremely variable. For a period after Jenner's epoch-making discovery it was believed that the vaccinated person was thenceforth always protected against smallpox; but the history of many epidemics has proved the fallacy of this belief, and it is now generally recognized that permanent immunity is of rare occurrence. In general it may be said that a severe case of smallpox is rarely seen within ten years of a successful vaccination; and that within five years, very few cases even of varioloid occur. Dillingham states that he has seen but one case of smallpox follow a successful vaccination within as short a time as five years. This was a very mild case of varioloid, vaccinated five years before. Not more than twenty lesions were present on the entire body.

There is now at North Brother Island a man, twenty-four years of age, who was once successfully vaccinated in childhood and again two years ago. The scar of this last vaccination is of good size and quality for a revaccination scar. The patient has a very mild attack of varioloid with about eighty lesions. This patient's wife, eighteen years of age, was also successfully vaccinated in childhood, and again two years ago. She is in the hospital with a mild case of varioloid.

In exceptional instances, neither smallpox nor vaccination appear to confer protection either against subsequent attacks of smallpox or aganist revaccination. Brouardel reports the case of a woman, thirty-two years of age, whom he saw in 1868 suffering from confluent variola. In 1871 she had an attack of discrete variola. In 1873 he vaccinated her, and was surprised to find that it took perfectly. Thereafter he revaccinated her six times at intervals of six months, and each time the vaccinal eruption appeared with absolute regularity.

Allbutt reports the case of a woman who had smallpox three times and was three times successfully vaccinated. She was born in 1858. Her mother had smallpox when the babe was eight days old and the child took it in mild form. At the age of three months she was successfully vaccinated, three scars resulting. In 1881 she was successfully revaccinated—two scars. In 1883 she had a second mild attack of smallpox. In September, 1892, she was successfully revaccinated for the second time. In November, 1892, and in 1893 vaccination failed. In 1896 she had a third very mild attack of smallpox.

With reference to the duration of immunity following vaccination, Wm. M. Welch has attempted to determine at what age after primary vaccination any considerable number of persons contract smallpox. He has compiled the following table from the records of the Philadelphia Smallpox Hospital.

TABLE I.

	Cases.	Deaths.	Per cent. of Deaths.
UNDER 1 YEAR.			
Unvaccinated	89	60	67.41
Vaccinated	2	0	0
1 TO 7 YEARS.			
Unvaccinated	467	221	47.32
Vaccinated in infancy—good scars	11	0	0
" " " fair "	10	1	10
" " " poor "	15	1	6.66
Total number vaccinated	36	2	5.55
7 TO 14 YEARS.			
Unvaccinated	242	72	29.75
Vaccinated in infancy—good scars	55	2	3.63
" " " fair "	23	2	8.69
" " " poor "	59	9	15.25
Total number vaccinated	137	13	9.48
14 YEARS UP.			
Unvaccinated	1,111	693	62.37
Vaccinated in infancy—good scars	1,406	122	8.67
" " " fair "	664	96	14.45
" " " poor "	1,027	286	27.84
Total number vaccinated	3,097	504	16.27

This table shows that the protection afforded by vaccination in infancy fails rarely before seven years of age, fairly often between seven and fourteen years and very often after fourteen years. It is evident, then, that in the presence of an epidemic the general rule that a successful vaccination will hold good for five or seven years is not to be relied upon.

Variability of Immunity.—In 1856, Lalagade, in a statistical study of 2,201 cases of revaccination, found that in children from five to ten years of age, revaccination was successful in only 8.75 per cent. of the cases; that between the ages of ten and thirty-five, the percentage of success was about 50; and that after thirty-five years the receptivity rapidly diminished. Unfortunately it is not stated whether the virus used in these tests was of proved efficiency. I note this startling omission in almost all reports. This may account for the discrepancy between Lalagade's results and those of the school vaccinators in this city. The virus which they use is rigidly tested upon primary cases before it is placed in their hands. Their reports show that at least 75 per cent. of the children in the primary and grammar school grades are susceptible to revaccination. In some schools in which revaccination has not been recently performed, the success has been above 95 per cent.

Short Duration of Immunity.—The duration of immunity to revaccination may be very short; and probably is short in a much larger proportion of cases than has been suspected, for the operation is seldom performed within one or even two years after a previous successful vaccination. Buchanan has reported a series of cases occurring in prisoners, in which successful vaccination followed closely upon a previous success. Four cases were in less than one month, nine cases between one and two months, four cases between two and three months, and twelve cases between three and six months.

At North Brother Island, where all patients are vaccinated upon arrival, it has happened that persons sent there repeatedly have been repeatedly vaccinated with success. In two instances success has followed within six months after the first vaccination. There are now at the Island eleven children between the ages of two and one-half and five years upon whom revaccination is "taking." In only one instance is the scar of the primary vaccination a faint one. The others all present good primary scars.

Three or four years ago, I myself made the following test upon 10 children. I performed the primary vaccinations by puncture in four spots each. Each case took typically in all four spots, and I exhibited them before a medical society in illustration of a paper upon methods of vaccination. Nine months later, I revaccinated all of these children in one spot each. Three of them "took," though they ran a mild course. Six days ago I revaccinated 20 children who were first vaccinated 4 months ago, with good takes and good resulting scars. Inspection to-day shows that 4 of these children are "taking," each showign a distinct though small vesicle which will evidently run an abortive course. This, in spite of the fact that control tests of the virus showed it to be of only moderate activity.

As regards susceptibility to revaccination the quality of the scar is an untrustworthy guide. Persons exhibiting poor primary scars are sometimes exceedingly refractory to revaccination; on the other hand it is very frequently possible successfully to revaccinate persons who present fairly recent scars of good quality. It is evident, therefore, not only that vaccination does not confer permanent immunity to revaccination, but that we can never be sure in a given case how long the immunity will last.

The immunity conferred by vaccination against revaccination is often of shorter duration than that which it confers against smallpox; in other words, a person may be successfully revaccinated while he is still immune to smallpox. Edward Jenner discovered this fact very early, and showed that among persons immune to smallpox both by exposure and by inoculation, natural cowpox might be induced again and again. It has already been shown that revaccination is often successful within five, or even two, years after a previous successful vaccination; yet it is well known that the number of cases of smallpox which occur within a similar period is very small.

Sir John Simon in his "Papers Relating to the History and Practice of Vaccination," after showing that 14,384 soldiers had been revaccinated with a success of 33 per cent., says: "Is it a legitimate inference that if these 14,384 soldiers had been exposed to smallpox every third man would have caught the disease? Certainly not. The inoculation of lymph is, so to speak, a finer and more delicate test of susceptibility to the smallpox poison than is the breathing of an infected atmosphere; so that many persons, when the lymph of cowpox is inserted in their skins, will give, locally at least, evidences of susceptibility which no atmospheric infection would have elicited from them. The success of vaccination after remote smallpox is also at least 33 per cent., whereas, notoriously, of persons who have once had smallpox not nearly one-third become afterward capable of contracting the disease again by frequenting the neighborhood of the sick."

A somewhat remarkable instance of an individual immune to smallpox but susceptible to vaccination, is found in the person of the present Resident Physician at North Brother Island. He was successfully vaccinated in childhood, a good scar resulting. A few years ago revaccination took poorly, leaving no scar. At the Island up to last August he had been vaccinated many times with no effect. For the past three and one-half months he has been in daily, intimate contact with the two hundred odd cases of smallpox which have been under his care, a very severe test of his immunity to the disease; yet ten days ago, seven months after his last attempt, he was vaccinated successfully. A distinct vesicle appeared at the

end of three and one-half days. An areola formed, and the pock ran through the short course of a reasonably good secondary "take," desiccation being nearly complete at the end of a week.

What Constitutes Efficient Vaccination?—The most efficient vaccination may be defined as that which secures to those vaccinated: (1) the smallest proportion of smallpox cases per thousand individuals; (2) the longest duration of immunity among those who finally take smallpox; (3) the lowest mortality among those who contract the disease; (4) the mildest course of the disease and the least amount of subsequent pitting, among those who, having had smallpox, survive it.

In performing vaccination, how many insertions of virus, and what sort of resulting scars are necessary to afford the most complete protection as judged by the above standard?

1. With reference to the proportion of smallpox cases per 1,000 individuals, Dr. E. C. Seaton and Dr. Buchanan made observations, during the smallpox epidemic in London in 1863, upon more than 50,000 persons. Some of these had never been vaccinated, but most of them had been vaccinated in various manners and degrees. Their results appear in the accompanying table:

TABLE II.

	No. Marked with Smallpox per 1,000. 360
1. Having no vaccination scars.	
2. Vaccinated.	
(1) Number of scars	
(*a*) one scar	6.80
(*b*) two scars	2.49
(*c*) three "	1.42
(*d*) four or more scars	0.67
(2) Quality of scar or scars	
(*a*) bad quality	7.60
(*b*) tolerable "	2.35
(*c*) excellent "	1.22

From this table it appears that the smallest proportion of persons who had had smallpox per 1,000 of persons examined was among those who had been vaccinated in four or more spots and among those who presented scars of excellent quality. As regards the smallpox pitting displayed, without quoting actual figures, the observers noted that the well vaccinated were more lightly marked than the poorly vaccinated.

2. With reference to the duration of immunity to smallpox following different methods of vaccination, R. Cory made observations between the years 1884 and 1887. To avoid the possibilty of error in diagnosis only those cases which were pitted were considered. Of such cases there were 448. The ages at which these persons developed smallpox are shown in the following table:

TABLE III.

	No. of cases.	Average age in years.
Unvaccinated	210	6.58
Alleged to have been vaccinated—no scar	105	9.86
Vaccinated		
1 scar	47	17.77
2 scars	31	17.82
3 "	33	18.02
4 "	12	18.67
5 or more scars	10	19.03

This table, so far as it goes, seems to show that vaccination by multiple insertion gives slightly longer immunity to smallpox than does the one spot method; but the number of cases in each class is too small to give much authority to the table.

3. With reference to the mortality rate in cases of smallpox which have followed vaccination by different methods, it is possible to quote figures covering large numbers of cases.

Gayton, in the Report of the Royal Commission on Vaccination 1889-90, gives the following table upon 7,415 cases of post vaccinal smallpox.

TABLE IV.

No. of Vaccination Scars.	No. of Cases of Smallpox.	Per cent. of Deaths.
1 scar	2,289	5.4
2 scars	2,464	3.6
3 "	1,424	3.1
4 "	1,238	1.6

It is to be understood with reference to this and to the following tables that the columns headed "Numbers of Scars" means the scars resulting from primary vaccination and not the scars of successive vaccinations at different times. This table points strongly toward the conclusion that vaccination by multiple insertion gives better protection than the single spot method.

J. F. Marson, for more than thirty years the Resident Physician of the London Smallpox Hospital, made very careful observations on the number and quality of the scars in all the cases of post vaccinal smallpox which came under his care. During the sixteen years from 1836 to 1861 3,094 cases of smallpox were treated in the hospital. Excluding 63 cases of death from smallpox complicated by other diseases in themselves fatal, he compiled the following mortality table:

TABLE V.

	Per cent of Deaths.	
1. Never vaccinated	35.5	
2. Alleged to have been vaccinated—no scar visible	21.7	
3. Vaccinated.		
1 scar		
good quality	4.23	7.57
indifferent quality	11.95	
2 scars		
good quality	2.68	4.13
indifferent quality	7.29	
3 scars		
good quality	1.63	1.85
indifferent quality	2.32	
4 or more scars		
good quality	0.99	0.74
indifferent quality	0.00	

TABLE VI.

Average mortality of all post vaccinal cases	6.76
" " " " 1 and 2 scar cases	6.21
" " " " 3 and 4 " "	1.30
" " " " good " "	3.04
" " " " indifferent scar cases	9.77

From these observations, Marson deduced the law that the efficiency of vaccination is in the exact ratio of its excellence and completeness as shown by the number and quality of the resulting scars.

During a second period of sixteen years, from 1852 to 1867, Marson continued his observations, the number of smallpox cases treated being 10,661. The results were as follows:

TABLE VII.

	Per cent. of Deaths.
1. Never vaccinated	34.9
2. Alleged to have been vaccinated—no scar visible	39.4
3. Vaccinated—1 scar	13.8
2 scars	7.7
3 "	3.0
4 or more scars	0.9

The percentages in this table differ somewhat from those in Marson's first table, but they point with equal emphasis to the superior efficiency of vaccination by multiple as compared with single insertion.

W. M. Welch, who for twenty-five years was in charge of the Philadelphia Smallpox Hospital, from a similar study of his cases, confirms Marson's view that the protective degree of vaccination can be measured to a considerable extent by the quality of the scars borne by the vaccinated persons. His experience, however, does not entirely agree with Marson's as to the relative value of multiple as compared with single insertion. The following is Welch's table:

TABLE VII.

	Cases.	Deaths.	Per cent. of Deaths.
Vaccinated	1,668	909	54.49
Alleged to have been vaccinated—no scar visible	258	150	58.13
Vaccinated during incubation of smallpox			
From 1 to 7 days before appearance of eruption	59	25	42.37
Longer than 7 days before appearance of eruption	95	17	17.89
Vaccinated in infancy—one good scar	820	70	8.58
" " " " fair "	451	70	15.52
" " " " poor "	874	256	29.29
Total number showing 1 scar	2,415	396	18.46
Vaccinated in infancy—two good scars	287	20	6.97
" " " " fair "	114	14	12.28
" " " " poor "	102	24	23.53
Total number showing 2 scars	503	58	11.53
Vaccinated in infancy—three good scars	122	10	8.19
" " " " fair "	49	4	8.16
" " " " poor "	51	13	25.49
Total number showing 3 scars	222	27	12.16
Vaccinated in infancy—four or more good scars	251	24	9.56
Vaccinated in infancy—four or more fair scars	81	10	12.34
Vaccinated in infancy—four or more poor scars	97	11	11.34
Total number showing 4 or more scars	429	45	10.49

Summarizing the post-vaccinal cases with reference to the quality of the scars we have

	Cases.	Deaths.	Per cent. of Deaths.
Vaccinated in infancy—good scars	1,480	124	8.38
" " " fair "	695	98	14.10
" " " poor "	1,24	304	27.04
Total number of post-vaccinal cases	3,299	526	15.90

An examination of this table shows that the protective power of vaccination is in proportion to the excellence of the resulting scars. As regards number of insertions, the table shows that one good scar protects better than two, three or four fair or poor scars, and practically as well as two, three or four good scars. Welch thereupon concludes that the quality of the scars following vaccination is a far more reliable indication of the degree of protection than the quantity, and that when the scars are typical it makes no difference whether they are single or multiple.

If, however, we compare the total number of cases vaccinated by the different methods, we get from Welch's own table figures which speak for the superiority of vaccination by multiple insertion. Thus:

TABLE IX.

	Cases.	Deaths.	Per cent. of Deaths.
Total number showing one scar	2,415	396	18.46
" " " two scars	503	58	11.53
" " " three "	222	27	12.16
" " " four or more scars	429	45	10.49

Taking the extremes of the table we have the mortality of the one scar cases 18.46 per cent. while that of the four or more scar cases is only 10.49 per cent.

4. As regards the severity of smallpox in patients who have been vaccinated by different methods and with different grades of resulting scars, Marson in his first series of cases found that (*a*) *as to number of scars*, of 2,245 patients with 1 and 2 scars, 392 or 17½ per cent. had confluent smallpox; of 542 patients with 3, 4 and more scars, 36 or only 6½ per cent. had confluent smallpox; (*b*) *as to quality of scars*, of 1,765 patients with good scars, 196 or 11 per cent. had confluent smallpox; of 1,022 patients with indifferent scars, 232 or 22 per cent. had confluent smallpox.

From all this evidence it seems fair to conclude with Marson, that "test the question in which way soever we will, the result is in favor of producing four vesicles, at least, at vaccination, with lymph which leaves good permanent cicatries."

Revaccination.

Husson and Bousquet, of Paris, believing that the existence of post-vaccinal smallpox was to be explained upon the theory that the immunity afforded by vaccination was after a time lost, were the first to recommend general and systematic revaccination. *That revaccination restores lost immunity is proved* by an overwhelming mass of evidence. It will be sufficient to cite a few figures. Revaccination was first extensively practised in the Prussion army; from 1834 to 1848, out of 425,000 soldiers revaccinated, 46.58 per cent. were successful. In these fourteen years there were but 77 cases of variola and varioloid in the army, and among them not a single death. In 1843, smallpox was epidemic in Prussia, yet in the entire army there were but 12 cases. In Würtemberg, in the early days of revaccination, among 14,284 revaccinated soldiers, only one case of smallpox appeared in five years. Among 26,964 revaccinated civilians, but five cases of smallpox appeared during the same period. During the Franco-Prussian war the German army, numbering 1,000,000, vaccinated and revaccinated men, lost only 459 men from smallpox during the years 1870 and 1871; while the French army, far less numerous, where revaccination was not compulsory, lost 23,400 men from this disesase in the same period.

Again, in Prussia, the mortality from smallpox in 1835 was 27 per 100,000; in 1872 it was 262. In 1874, vaccination and revaccination became obligatory, and the mortality fell at once to 3.6 per 100,000. In 1886 there were 197 deaths from smallpox in the entire German Empire, or

only 0.39 per 100,000. In 1888, with an increased population, the number of deaths had fallen to 110 for the whole year.

Even more significant is the evidence of the smallpox hospitals. Marston states that in thirty years few smallpox patients were admitted who had been revaccinated with effect; and these had very mild varioloid. Among the nurses and attendants, not one who had been revaccinated contracted the disease. Wm. Welch in an experience of 25 years at the Municipal Hospital of Philadelphia found that no physician, nurse or other employé who had been revaccinated before commencing duty developed smallpox or varioloid.

The proposition that *revaccination protects as fully as a previous attack of variola* is proved by the following figures, which I quote from Le Fort: In 1887, in Sheffield, there were 18,121 persons who had already had smallpox, and of these 23 contracted the disease again, that is to say, a proportion of 1.3 per 1,000. Of 63,354 revaccinated individuals, 75 contracted smallpox, a proportion of 1.1 per 1,000.

By the statistics of the same epidemic, this author showed that *a successfully revaccinated person is much better protected than one who has been but once vaccinated;* for, while revaccinated persons contracted smallpox in the proportion of only 1.1 per 1,000, those who had been but once vaccinated contracted the disease in the ratio of 230 per 1,000.

It is evident therefore that if we would preserve vaccinal immunity, revaccination should be performed as conscientiously as primary vaccination. In the absence of an epidemic, this may be postponed until the child is of school age; but if smallpox becomes prevalent it should be performed at once even if the primary vaccination was of recent date.

While it is important that the primary vaccination should be performed in such a way as to give the highest degree of protection, we must remember that after a variable number of years immunity derived from the most efficient primary vaccination is lost. There is no doubt that an adult who was successfully vaccinated in infancy and again at puberty by the one spot method, is much better protected than one whose primary vaccination was performed by multiple insertion, and who has not been revaccinated.

The character of the eruption in revaccination is usually different from that observed in primary cases.

Instances are sometimes met with in which the immunity resulting from the first vaccination has been so completely lost that the pock of the revaccination presents the typical characters of a primary case; but I think the school vaccinators, whose experience in revaccination runs into the hundreds of thousands of cases will confirm the assertion that this is not often so.

As a rule the eruption is at no time so purely vesicular as in a primary case, the pustule and the areola develop earlier, and desiccation is complete at a correspondingly early date; so that, often, a successful revaccination has already cicatrized and shed its scab by the end of the second week. The resulting scar is likely to be small, faint and poorly marked. Some cases, however, starting as above, do not dry up quickly, but pass into a stage of more marked inflammation and more severe constitutional symptoms than are usually seen even in severe primary cases.

Instances of very long periods of incubation after revaccination are also reported—the vesicle not appearing until the 10th, 14th, 18th or even 30th day. Persons whose immunity has been but partially lost present marked modifications of the typical vaccinal eruption. To this class of cases, Trousseau and Dumont Pallier, in 1860, gave the name of "vaccinoid," a condition bearing the same relation to vaccinia that varioloid bears to variola. Hervieux accepted this view, and demonstrated in 1893 that vaccinoid transmits by inoculation true vaccinia, and that, like vaccinia, it confers protection against smallpox. Hervieux describes three types of vaccinoid, dependent upon the extent to which the weakening of the immunity has advanced: (1) At the point of inoculation there appears a pink papule, hardly at all elevated above the surrounding integument, and without any areola; it disappears at the end of a few days, leaving no scar. (2) There forms an acuminate papule, larger than that seen in the first type of vaccinoid, redder, more distinctly visible, surmounted by a little vesicle at its point, surrounded by a faint areola, and leaving after desiccation a little scab which falls soon without the formation of a cicatrix. (3) The vesicle is more distinct, the areola is more pronounced, the scab is larger and more adherent and leaves behind it a cicatrix, which, however, disappears in the course of time.

Poor virus will often give a vaccinoid eruption in cases which will respond more nearly typically to virus of high grade activity. This "false vaccinoid," if such an expression may be used, cannot be depended upon to confer complete immunity. In deciding on the value of the result obtained in any given case of revaccination, therefore, the physician should be sure of the efficiency of his virus. It is too often the case that one is lulled into a false sense of security by a vaccinoid pock, due not to partial immunity but to poor virus.

The character of the eruption, then, in revaccination depends upon the degree of immunity conferred by previous vaccination, and upon the quality of the virus employed. If high-grade virus has been used, (*a*) failure shows that the subject is still immune; (*b*) vaccinoid completes a previously partial immunity; (*c*) typical vaccinia restores a completely lost immunity.

If poor virus has been used, the results are unreliable. (*a*) Failure proves nothing; (*b*) vaccinoid gives only partial immunity; (*c*) vaccinia will probably not be observed. If it is, it con-

fers immunity, and shows that the operator happened to encounter a good streak in a lot of poor virus.

Vaccine Virus.—The Necessity of Having It Tested Physiologically Before It is Issued, and of Retesting It Frequently.

I shall say nothing about the form in which vaccine virus should be issued. I believe, however, that glycerinated virus is the best. I do wish to emphasize very strongly that all virus should be subjected to a rigid physiological test, preferably upon previously unvaccinated children, before it is issued. This is the only way in which its efficiency can be positively established. One would think that, in all vaccine laboratories, such tests would be made as a matter of course, but I believe that much of the commercial virus is not thus tested. Either its efficiency is inferred from the appearance of the eruption upon the calf which furnishes it, or at most, each lot is tested by inoculation in one or two spots upon the next animal to be vaccinated. This, I believe is not sufficient.

The virus with which I have had most experience is tested as follows: it is inserted in three spots upon each of five previously unvaccinated children, and must result in 15 vesicles of good quality and size in order to reach the standard required for issuance. It must take not merely in every *case,* but in every *spot* in which it is inserted.

If virus is to be kept for any length of time it should be retested every month, as it has been found that some virus, though up to the standard at the time of issue, is unaccountably short-lived. The duration of efficiency of glycerinated virus is fairly constantly proportionate to the degree of dilution. A great deal of the commercial virus is far too dilute to retain its efficiency long. That which is issued by the vaccine laboratory of the New York City Health Department is diluted in the proportion of one part by weight of pulp to 3, 4 or 5 by bulk of a glycerin and water mixture, consisting of two-thirds glycerin and one-third water; the usual ratio of pulp to glycerin and water is 1 to 3. The average duration of continuous efficiency in the virus collected in 1896 and 1897 from 117 consecutive animals, as shown by frequent retests upon children was 7.7 months.

Methods of Vaccination.

It has already been shown that four spot vaccination confers the most complete immunity.

Site of Scarification.—In the female subject, the scarification may well be made, for cosmetic reasons, upon the leg instead of the arm. The only objection to this site is that in babies and young children a pock in this situation is more difficult to keep clean. In older persons, it is rather more likely to be sore than when it is situated upon the arm, because the leg cannot be kept so constantly at rest; but these objections are trivial when compared with the misfortune of having to carry through life an unsightly scar upon a member which is so often displayed in society.

The lower and outer part of the thigh is often selected as the site of scarification. If a spot in this region gets very sore, it is difficult to keep a dressing over it, especially in the adult subject. The upper and inner aspect of the leg is sometimes chosen. In this position a very sore pock might interfere somewhat with bending of the knee, and there is possible danger of thrombosis of the adjacent internal saphenous vein.

The best site is probably the anterior-external aspect of the leg, over the uppermost part of the tibialis anticus muscle. A pustule in this position is far enough forward not to be pressed upon when the person lies on the side; it is near no large vein, it does not interfere with bending of the knee, and if it gets very sore a dressing can be easily retained over it. In the male subject, the skin of the upper arm over the insertion of the deltoid is the site of election.

Methods of Scarification.—Many methods have been employed. They may be classified as follows: (1) Puncture, with lancet or hypodermic needle; (2) linear incision, with lancet or needle; (3) scarification of an area by means of lancet or needle; (4) denudation of an area by means of a solution of caustic potash.

Any one of these methods may be used, though I think two of them are open to some objections, namely, (*a*) the hypodermic method. It is difficult to inject merely into the skin. The needle will almost inevitably go though into the subcutaneous tissue; and Chauveau has shown that by this means a generalized vaccinal eruption may be produced; (*b*) denudation of the skin by means of a solution of caustic potash. This is the least painful of all methods of scarification. Great skill is, however, required to avoid denuding too large an area. Moreover, the action of the caustic causes the formation over the denuded area of a parchment-like eschar. This eschar is composed of necrosed tissue killed by the action of the caustic, and, as I have shown in a series of experimental cases, it materially interferes with the absorption of the virus; so that vaccination by this method is likely to be uncertain in its results.

The simplest and best method I believe to be the scarification of *small* areas with a needle. Virus as active as that now being issued by the Health Department of this city will result in pocks of unnecessarily large size if the scarified areas be more than one-eighth inch square.

As to the technic of the operation, a few longitudinal scratches well into the deep skin, are sufficient. It is not necessary to scarify criss-cross. For cosmetic reasons it is well to try to draw as little blood as possible, but it is a mistake to think that any ordinary blood-flow will interfere with the success of the vaccination, if the virus is thoroughly applied.

Outfit for Vaccination.—A convenient vaccinating outfit is one such as is issued by the New

York City Health Department. It consists of a needle, an hermetically sealed capillary tube containing glycerinated virus, a bit of rubber tubing of caliber corresponding to that of the capillary tube, an orange-wood toothpick with one broad end.

Directions for Vaccination.—(1) Wash the region to be scarified, with alcohol, and let it dry by evaporation. No other cleansing is necessary. (2) Wash the needle point with alcohol, or hold it for a moment in the flame of an alcohol lamp or gas jet, then make a few longitudinal scratches which shall penetrate well into the true skin, over an area not more than one-eighth inch square. The number of spots thus scarified should correspond to the number of vesicles which it is desired to produce. The spots should be at least one inch apart. It is a matter of indifference except for the sake of appearances, whether blood is drawn or not. (3) Break off both ends of the capillary tube, insert one end in the rubber tube, and blow out the drop of virus upon the broad end of the toothpick. (4) Apply the virus to the scarified areas, and scratch it in thoroughly with the sharp corner of the toothpick. It is not sufficient merely to smear the virus on. (5) Leave the limb uncovered for a few minutes until it has at least partially dried.

After-care.—The best dressing is a very loose sleeve (or stocking), lined with clean linen or with absorbent gauze. The use of shields is of questionable value. Those which tie on are an abomination. If tied tightly enough to stay in place, the arm is uncomfortably constricted; if tied more loosely they slip, and the vesicles are very likely to be destroyed by the hard edge of the shield. Those shields which fasten on by means of adhesive plaster are often left in place too long, the pustules become macerated, and running sores are the result.

A word as to the care of sore arms. In my opinion, an infected and discharging vaccination wound should be cared for, or at least kept under observation by the physician. Many a mother who would not dare attempt to deal with any other infected wound, struggles on bravely, but ignorantly, trying to care for an infected pock, because, forsooth, "it is only a vaccination sore." This mistaken attitude, assumed by the mother, and usually approved of, or at least not objected to, by the physician, is, I believe, responsible for more than half the putrid sloughs and slow-healing ulcers which are so often seen.

There is a very general belief, even among physicians, that the pock, though infected, should not be opened, for fear of impairing the protection afforded by the vaccination. It is, of course, well to avoid breaking the vesicle of a normal uncomplicated vaccination, but remember that destruction of the vesicle does not impair the immunity, and do not hesitate in an infected case to remove the scab, open the pustule, clean the base thoroughly, and treat the wound upon general surgical principles. Much unnecessary suffering may thus be avoided.

Points to be Emphasized.

1. Complete natural immunity to vaccination is practically unknown.

2. In primary cases, delayed vesiculation, raspberry excrescence, and abortive course, mean poor virus.

3. Among the complications, there is now no danger of transmitting syphilis or tuberculosis. Other infections such as erysipelas, cellulitis, septicemia, etc., are more rare as methods of preparing virus improve, and more care is used at the time of vaccination and in the subsequent management of the case.

4. During the second week of vaccinia, a large painful areola may be considered normal if it be bright red, and if the vesicle be of typical appearance. If the vesicle be irregular, filled with greenish pus, and the areola be of a dark livid, purplish hue, the case is one of mixed infection.

5. Generalized vaccinia, aside from cases in which the eruption is spread by auto-inoculation, is rare. Cases of doubtful diagnosis may be tested by the inoculation of lymph from one of the vesicles into another subject. If it be true generalized vaccinia, a localized vaccinia will develop in the inoculated person.

6. The destruction of the vaccine vesicle does not interfere with the immunity conferred by the vaccination.

7. Immunity is acquired about the time the areola is at its height—eight to ten days after vaccination. If smallpox appears at this time it will be mild. If the eruption appears before the vaccination has reached the areolar stage, the disease will not be much modified by the vaccination.

8. Vaccination of the pregnant woman does not protect her child.

9. The fetus *in utero* may have smallpox, if the mother has it, and may be born with an active rash or with healed scars. A child born while the mother has smallpox is not only not protected, but has been exposed *in utero*, and will probably develop the disease before there is time to secure protection by vaccination.

10. The duration of immunity to smallpox which is conferred by vaccination is extremely variable, and in the presence of an epidemic, the fact of recent successful vaccination is only presumptive evidence of immunity. Of persons successfully vaccinated within five years, very few will contract the disease; but some will, though they will probably have varioloid instead of severe smallpox.

11. The duration of immunity to revaccination which is conferred by vaccination is also extremely variable, and is probably short (two years or under) in a larger proportion of cases than has been supposed.

12. The protective power of vaccination is in direct proportion to its excellence and completeness as shown by the number and quality of the resulting scars. Of the two elements which enter into this protective value, quality of scars is more important than number.

13. While the quality of a scar is a fair indicator of its protective power against smallpox, it is an untrustworthy guide in deciding whether the individual is susceptible to revaccination.

14. A person who is immune to smallpox can often be successfully revaccinated.

15. Revaccination protects against smallpox as fully as an attack of the disease protects against a subsequent attack.

16. A person who has been successfully revaccinated is much less likely to contract or to die of smallpox than a person who has been vaccinated only once. The more successful vaccinations one has had at different times, the more certain is his immunity, and the better his chance of recovery if he does contract the disease.

17. Revaccination, therefore, should be considered as important as primary vaccination, and should be just as systematically practised.

18. Primary vaccination should be performed in infancy, revaccination at school age. In the presence of an epidemic, however, revaccination should be performed even though the primary vaccination was of comparatively recent date.

19. The eruption in revaccination is more likely to follow the type of vaccinoid, than that of typical vaccinia.

20. Vaccinoid protects if the virus used is of high-grade efficiency. If the virus is poor, only partial immunity is conferred.

21. All vaccine virus should be subjected to rigid physiological tests before issuance. It should be retested monthly, so long as it is on sale. The virus from each animal should be kept by itself and numbered. It should be known by this number when issued so that it can be called in if retests show that its efficiency has expired.

22. Vaccination should be performed under aseptic precautions.

23. It is not sufficient merely to smear the virus upon the scarified areas. It must be thoroughly rubbed or scratched or pricked in.

24. Vaccination shields often do more harm than good.

25. Cases of infected vaccination should be cared for by the physician and not by the mother.

26. Remember that the destruction of the vesicle does not impair the protective power of vaccination, and if signs of mixed infection appear, open the vesicle, cleanse the wound and treat it upon general surgical principles.

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THE METHOD OF PREPARATION OF VACCINE VIRUS IN THE VACCINE LABORATORY OF THE NEW YORK CITY HEALTH DEPARTMENT.

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THE vaccine virus at present used by the Health Department is entirely animal. It will doubtless be remembered that Galbiati began the use of bovine virus in 1803 in Naples, and that his successor, Negri, introduced the practice in Paris in 1864; that in 1870 animal vaccination was brought to this country, and that in 1876 it was adopted as the uniform practice of the Health Department of this City.

The reasons for the preference of animal virus to human virus are that with the former, first there is less possibility of the communication of disease, especially of syphilis, and, second, it is not necessary to open, or in any way mutilate the vesicles on the arms of children, and, therefore, there is less possibility of a late infection occurring in them.

The animals used are calves. While goats, sheep, pigs, and several other animals are susceptible to vaccinia, and can furnish in an emergency a virus which will produce the typical disease in the human body, they are all inferior to calves and cows in the amount of virus, or the typical character of the vesicles produced, or in the ease with which they can be handled. With reference to the choice between calves and older animals of the same species, decision rests on the fact that the calves have a softer skin and the vaccine vesicles on them run a more typical course. The calves are chosen for their health and good quality of the skin; this means that they receive a careful examination before vaccination. After vaccination they are killed and their organs are examined for possible disease. If disease is found at their entrance into the laboratory, they are not vaccinated. If disease is found at autopsy the virus obtained from them is rejected.

The diseases that are considered of practical consequence are tuberculosis and skin disease, for although it has never been demonstrated that tuberculosis has been conveyed by vaccination it is easy to avoid the suspicion that it may be. There have been reported from abroad some cases of skin disease which were thought to have been inoculated with virus coming from calves having skin disease. For safety's sake, therefore, only healthy calves are chosen.

The calves are females so that the urine being discharged behind the animal the stall may be kept clean. After the animal is cleaned, and that means that the skin is curried, brushed and washed, and that the hoofs are scrubbed, the animal is placed on a bench, on its side, with one hind leg fastened in a vertical position, and the skin over the posterior abdomen and on the inside of the thighs is shaved. This particular part of the skin is chosen because it is found by experi-

ment that in no other part of the body are the vesicles so large and so typical.

The animal is then taken to a separate operating-room, which, it may be said in passing, has a cement floor, glazed brick walls, and the same operating furniture that is found in a hospital operating-room. Here the calf is covered with towels except that portion of the skin on which vaccination is to be made, and this portion is washed with soap and water and with alcohol. This is, of course, not a notably antiseptic preparation. It has been found that treating the skin so as to make it as nearly as possible aseptic, for it cannot be made by any means entirely aseptic, simply roughens the skin and makes dirt adhere to it more firmly during the week in which the part must be largely unprotected.

On this clean skin is then made a series of superficial incisions, about one quarter of an inch apart, and covering the entire shaven area. Linear incisions are preferred to scarifications because with the former more typical vesicles result and a larger amount of virus is secured; they are preferable to punctures because the former yield more virus. The incisions in some cases draw blood enough to show a red line, in other cases they do not show red at all; they are made superficial because deep incisions are found to be more apt to become infected, and because they cause more pain to the animal. Into these incisions the seed virus is rubbed. This seed virus is either humanized virus collected by touching sterile pieces of bone to the serum exuding from ruptured vesicles on the arms of children, or, in the great majority of cases, bovine glycerinated virus, which has been preserved two months or longer. It has been found that fresh bovine virus when used as seed produces some sort of infection of the animal with consequent degeneration of the virus, whereas old virus is free from that objection.

No cover is placed over the vaccinated area, for although covers have been contrived, and although there has been much experimenting done in this direction in Germany, as well as in this country, nothing has been found which will stay in place satisfactorily, and in those exceptional cases in which a cover does maintain its place it is not found that the virus is any more free from extraneous substances than when the only cover is the natural crust.

The animals are well cared for and fed on milk, their temperature and general condition is watched closely, and usually on the sixth day after vaccination, sometimes on the fifth, rarely on the fourth, and rarely on the seventh, the virus is collected. For this purpose the calf is again placed on the table in the operating-room. The vaccinated area is cleaned and the vesicles, which have formed, are scraped from their beds with a sharp curette. This pulp is weighed and emulsified by running it through a mill on which a mixture of 66 per cent. of glycerine and 33 per cent. of water flows. This proportion is chosen because pure glycerine has an antiseptic effect on the vaccine organism, while diluted glycerin does not injure the virus, but kills only the extraneous germs. The proportion of virus to glycerine and water is usually one to three. It is sometimes one to four, and sometimes one to five. Sometimes the pulp is found to be rather watery, and in that case less glycerine and water is necessary. Sometimes it is rather solid, and then more can be added. Proportions as small as one-to-ten or one-to-fifteen have still been found efficient, but as a rather dilute virus cannot be considered as certain in its action as a more concentrated one it has been thought wise to keep the percentage of virus in the emulsion high.

This emulsion is drawn into large glass storage tubes, which are sealed at each end by flame, and is preserved in these until needed for use. It is then poured from the tubes into vials, which are used when many persons are to be vaccinated at one time, or poured into small receptacles from which capillary tubes are filled, when the vaccine is to be used for one person at a time.

Every lot of virus issued bears stamped on it the number of the calf from which it was taken, and the date of collection. Before issue it is tested as to its efficiency by use on five previously unvaccinated children, and after issue watch over its efficiency is maintained by retests made at more or less regular intervals.

It is always found that the fresh virus and the fresh emulsion contain large number of saprophytes. It is impossible by any means to get fresh virus without these organisms, but the great majority of them die out in the glycerine emulsion in the course of a few weeks. Some persistent ones may last one or two, or even three or four months, but they are non-pathogenic.

MEDICAL PROGRESS.

Treatment of Pneumonia.—With the exception of typhoid fever, few subjects in therapy have caused so much discussion as the treatment of pneumonia for while a suitable antitoxin is still lacking, all measures must naturally be empirical or symptomatic. H. PASSLER (*Münch. med. Woch.*, Feb. 19-26, 1901) warns urgently against falling into any routine plan of treatment and by pointing out the various way in which a pneumonia may kill indicates how Nature may be supported. Death may ensue (1) by direct asphyxiation, the surface of lung remaining uninvolved being too small to lead to proper oxygenation of the blood. Such cases are, however, rare; (2) through failure of the right heart on account of the increased resistance offered to the pulmonic circulation. This occurs less frequently than is generally supposed for high-graded dyspnea and cyanosis with edemas and increased cardiac dulness, which would naturally follow, are not often observed before death and the danger to life stands by no

means in direct relation to the amount of lung-tissue implicated; (3) complications frequently settle the fate of the patient. The most important of them are chronic alcoholism, cardiac disease and advanced age. But all these factors are subservient in importance to the last; (4) the developing of a pneumococcus sepsis with a resulting paralysis of the vasomotor centers. It is this cause which so often proves fatal to young and healthy individuals who at first seem to have the best chances for recovery. The first principle in treatment should be to prevent the spreading of the inflammation. Local applications to the chest in the form of moist packs, ice-bags, cupping or mustard plasters, by diminishing the pain, will do much to accomplish this end since the respirations are rendered more effective and stagnation of infectious matter is prevented. Should such methods be insufficient it is proper to give small doses of morphine which also act as expectorants. High temperatures require lukewarm or cold baths. but a clouded sensorium is a still greater indication for them. The surest way of relieving overfilling of the right heart is venesection. Alcoholics require whiskey in sufficient amount to sustain them and bromides with opium rather than chloral, which always depresses the vasomotor center, may be in place. With the onset of the first symptoms of cardiac insufficiency the free use of digitalis or digitalin becomes absolutely necessary and in all cardiac cases the dietetic treatment plays an important part. But few remedies stand at our disposal when sepsis appears, it is then merely possible to stimulate the circulatory system with strychnine, digitalis, salt infusion, and last, but not least, caffeine, which has an especial tonic action on the vasomotor center.

Suprarenal in Hemoptysis.—The necessity for a prompt and reliable remedy, free from toxic or unpleasant after-effects, to control hemoptysis has led W. B. KENWORTHY (*Med. Rec.*, Mch. 16, 1901) to try suprarenal extract. In fourteen cases the hemorrhage stopped quickly, and in only one case did it continue beyond fifteen minutes after the first dose. There was also decided strengthening and slowing of the pulse, lessening of cough and expectoration, and marked improvement in respiration. The writer gives powders of gm. 0.2 (gr.iij.) every half-hour until three are taken; then every two hours until three more are taken; then three times a day for a week. He orders them taken dry on the tongue, chewed, and swallowed without water.

Staining of Plasmodia.—G. MAURER (*Münch. med. Woch.*, Feb. 26, 1901) recommends the following modification of the Romanowsky stain for plasmodia. A one-per-cent. aqueous solution of medicinal methylene blue with one-half of one-fourth-per-cent. of soda is allowed to stand for from two to three weeks at 37°C. or for from four to eight days at 60°C. Then a one-tenth-per-cent. aqueous, yellowish, water-soluble solution of eosin is prepared; 15 drops of the first solution are then added to 25 c.c. of water, 15 drops of the second to another 25 c.c. of water; both dilutions are then poured together and the slide immersed for from thirty to forty-five minutes. The red cells will appear pink; the platelets, dark carmine; the nuclei of the leucocytes, dark red and their body red; the nuclei of the lymphocytes, dark red, their body blue with red granules, while the malarial bodies appear blue with red centers. With the tertian parasite peculiar red dots appear in the erythrocytes with this stain.

Typhoid Fever.—Of 137 cases treated at the Royal Victoria Hospital in Montreal, and reported by D. B. GILLIES (*Montreal Med. Jour.*, Feb., 1901) the average age was twenty-four years, ranging from two and one-half to sixty-one. The largest number of cases was admitted during June, the smallest during March. The most frequent symptoms at onset were anorexia, general malaise, and frontal headache. One case began like pneumonia; in 12.4 per cent. a rigor occurred at onset or in the first week; 25 per cent. began with diarrhea; 26 per cent. with vomiting; 13 per cent. had delirium; one case acute mania, and 24 per cent. had epistaxis. The "rose spots" were present in 69 per cent.; in 2 cases there was diffuse erythema; in 4 cases a purpuric rash, and in one a rash of macules, papules, and petechiæ. The spleen was palpable in 61 per cent. and earliest felt on the fourth day. There were 5.4 per cent. of relapses. In one case the maximum temperature was 100° F. Perforation occurred in 4 cases, jaundice in 2, cholecystitis in one, meteorism in 20 per cent., and intestinal hemorrhage in 12 per cent., in four of which it was fatal. Systolic murmurs were heard in 11 cases; acute dilatation of the heart occurred in two, femoral phlebitis in five on the left and two on the right side and brachial phlebitis in one case. The lung complications were acute bronchitis in 18 per cent.; dry pleurisy, pleurisy with effusion, tuberculosis, and acute lobar pneumonia. There was hematuria in 2 cases, febrile albuminuria in 10 per cent., acute nephritis in 3 cases, suppurative otitis media in 4, abscesses in 6, periostitis in 3, arthritis in one, superficial gangrene in 2, and tender toes in 10 cases. The Widal reaction was negative in only one case, but was not recorded in 4 cases. It appears earliest on the fourth day, and latest on the thirty-third day. On the day of discharge the reaction was present in all but 6 of 96 patients. Ehrlich's reaction was found in only 34 per cent.

Prophylaxis by Antitoxin.—P. R. BLAKE (*Lancet*, Jan. 26, 1901) reports absolute prevention in 35 patients. In 31 patients no reaction followed injection; in no patient did any local lesion occur at site of injection. In the 4 patients in

which reaction occurred no severe symptoms developed; the highest temperature was 101° F., the rash, eruption lymphadenitis and arthritis appearing only to vanish in a few days.

Arsenic in Spleno-Medullary Leucemia.—CHARLES HEATON (*Lancet*, Jan. 26, 1901) cites an unusual case of tolerance to this drug when injected hypodermatically and with a weak solution of Eucaine B. The patient had been taking liquor arsenicalis in very small doses; m ij-iij by mouth, t. i. d., but gastric irritation prevented its continuance. The total number of days of treatment was 271, including intervals amounting to 58 days, and the total amount of hypodermatic administration was: Arsenious acid, 5½ grains; arseniate of soda, 105 grains. The maximum dose was 2⅔ grains of arseniate of soda, equivalent to 4 drams 26 minims of liquor sodæ arseniatii. Twenty minims of a 1:500 solution of Eucaine B., in which the arsenic salt was dissolved, together with the use of a very fine needle did away with any pain which might otherwise have accompanied the treatment. It is interesting, however, to note that despite the use of these heroic doses there was no paramount improvement, this case seeming to show that arsenic is, at best, no more than palliative in this obstinate blood discrasia.

Caustics and Cancer.—J. COURTIN (*La Gynecologie*, Feb. 1, 1901) aside from the surgical extirpation of the cancerous uterus reviews the methods and usefulness of caustics as therapeutic measures. They have the advantage of being within the reach of those whose surgical experience is limited and of coming into the field when operation has failed or can not be done, but the disadvantage of almost always provoking violent and incontrollable spread of the disease if used on early nodules. It is therefore best to use cauterization and its adjuvants curetting and partial extirpation only when the disease is so extensive as to defy total removal. The actual red-hot iron is a more efficacious instrument than the electric or the Paquelin cautery for such duty as this. Chemical caustics are either injected into the cancer substance or in the form of pencils embedded in it. Chiefly used in this way are the acids, acetic, sulphuric, hydrochloric, nitric, chromic and phenic. All have the advantage of compelling frequent dressings which are in themselves of service. Bromine from 1 in 16 to 1 in 5 parts in solution is occasionally employed, that which escapes into the vagina must be neutralized there by bicarbonate of coda. Arsenious acid, grm. 0.20; cocaine, grm. 1.00 and water to 100.00 grams is in the writer's experience a most valuable formula for injecting. A judicious use of caustics will keep an inoperable cancer clean, odorless and as near a healthy granulating surface as its nature can permit.

Tuberculosis.—C. F. MARTIN and F. T. TOOKE (*Montreal Med. Jour.*, Feb., 1901) find many cases of tuberculosis which give few or no outward signs of disease. There is a type with slight persistent hacking cough and little or no expectoration; also the type in which a large hemorrhage is the first sign, and cases in which chronic bronchitis and emphysema mask the signs. Some cases begin as acute bronchitis and others give a long history of repeated "bad colds." Some have been treated for anemia, others for neurasthenia, and many for gastric disease. Pains in the stomach and diarrhea were most common in these masked cases. Fistula *in ano* is always suspicious. Certain cases with marked involvement and symptoms have no fever; and some with proper food and rest may gain from week to week even with marked daily fever.

THERAPEUTIC HINTS.

Atropine in Hyperchlorhydria.—ANTONIO STORET, after a series of investigations, concludes that atropine, whether given by mouth or hypodermically, produces as its first effect a constant and characteristic diminution in the gastric juice. However, after several days its power is lost, and the hyperchlorhydria is as bad as ever. At the same time certain disagreeable sensations of motor activity of the stomach supervene. The dose used was gm. 0.0005 (gr. $^1/_{130}$) given half an hour before the meal.

Vomiting After Anesthesia.—During the first 6 to 12 hours give one to two teaspoonfuls of toast-water or hot water, writes HUNTER ROBB (*Cleveland Med. Gaz.*, Feb., 1901) and keep the head on a level with body. For persistent nausea give 2 or 3 tablespoonfuls of hot water with gram 0.7 (gr. x) of sodium bicarbonate. Repeat every hour when necessary and apply mustard to epigastrium. Lavage may be of advantage in some cases, and treatment for constipation or tympany is always indicated. As a last resort a hypodermic or morphine over the epigastrium may relieve the extreme retching. The persistence of vomiting for 3 or 4 days after operation is very suggestive of peritonitis.

Epilepsy.—TOULOUSE recommends the administration of sodium bromide and at the same time reducing to a minimum the sodium chloride ingested. Bunge states that 1 or 2 grams (gr. 15-30) a day of the latter will suffice for an average man, though many ingest as much as 20 or 30 grams (℥v-viii). If this surplus salt is replaced by sodium bromide the life processes continue normal, and in 20 of Toulouse's cases the aggregate diminution in the attacks amounted to 92 per cent. He advises the following diet. 7 a.m., milk, 250 c.c. (℥viii); 11 a.m., coffee and two cakes made with eggs, farina, milk, and sugar; 3 p.m., porridge mode with farina, sugar, boiling milk. etc.; 5.30 p.m., bouillon unsalted, boiled beef unsalted, potatoes, fresh beans or peas, fruit in moderation. He gives grams 2.0 (gr. xxx) of sodium bromide daily.

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SATURDAY, MARCH 30, 1901.

THE BELLEVUE HOSPITAL REPORT.

WE publish in full this week the report of the Medical Board of Bellevue Hospital, which has been the subject of so much discussion. The abuses that have been hinted at, the reforms that have been suggested, the radical change of methods that are needed are herein succinctly set forth.

We by no means underestimate the value of the improvements that have taken place as a result of Commissioner Keller's investigations, and we fully appreciate the fact that Bellevue's palmiest days never touched anything like the present standard of perfection. Yet we are mindful of the fact that this report is an accurate statement of conditions that existed a few months ago, and we are also aware that Commissioner Keller's term has not many more months to run. When his energy and coöperation are removed will this upward tendency degenerate down to the conditions on which this report is based? We have seen too many reformers, who, like

"The King of France with forty thousand men
Marched up the hill and then marched down again,"

and we fear that unless the reform is assured the hospital will retrograde and sink into the hands of the politicians who at present have discretion enough to "lay low and keep on sayin' nuffin'."

The work of the Charter Revision Committee is slowly being rounded out and we trust that the trustee system which is there advocated may soon be put in operation in this, one of the city's grandest possibilities.

THE SEMICIRCULAR CANALS.

MOTOR troubles consequent to lesions of the semicircular canals of the ear have formed the groundwork of a series of hypotheses relative to the functions of these organs. Many of these hypotheses are characterized by their extreme ingenuity, yet it cannot be said that this question of physiology has been thoroughly made clear. The fundamental questions seem to be, are the troubles which follow section and destruction of the semicircular canals due to their absence, to the paralysis of any organ, or are they to be classed as reflex phenomena, determined by some form of mechanical irritation?

An ingenious method of experimentation has been recently utilized by G. Gaglio of the Pharmacological Institute of Messina (*Archives Italiennes de Biologie,* Vol. 31, p. 377). By the use of cocaine thrown directly into the semicircular canals, he believes that he can thus bring about a temporary abolition of their function and in this manner can determine, in part at least, what that function is.

Experiments first made on pigeons, by sectioning the various canals and then applying cocaine, demonstrated that the application of the cocaine did not markedly modify the motor disturbances which were induced by sectioning and further research brought out clearly that the action of the cocaine induced a set of symptoms similar to that produced by the destruction of the organs in question. The pigeons were unable to fly, staggered, and made incessant oscillatory movements of the head lasting for about one-half hour, coincident with the stage of anesthesia produced by the cocaine; the ability to fly was the last power regained. Vomiting or attempts at vomiting were noted.

From these experiments and many others, the author comes to the conclusion that it is idle at the present time to formulate hypotheses concerning the function of the semicircular canals. Many more facts are needed.

One fact, however, seems fairly well established by these experiments by means of cocaine. They seem to prove that the peculiar motor symptoms characteristic of section or destruction of these canals are due to the suppression of a definite function and are not reflex acts induced by sensory or traumatic irritation.

A SOCIETY FOR THE STUDY OF PRACTICAL HYGIENE.

THE reports of the officers at the annual meeting of the "Society for Instruction in First Aid to the Injured," on Friday, February 15, 1901, showed such a magnitude of work accomplished that the founders of that society must be exceedingly gratified.

Many lives have undoubtedly been saved, and an immeasurable amount of suffering avoided by the services of graduates of those classes. The knowledge of what to do in emergency cases, until a doctor arrives, is often the means of keeping intact the thread upon which a life hangs. Furthermore, the greater intelligence regarding the treatment necessary for various surgical conditions has rendered the laity much more ready to submit to a rational procedure than they often times were before the origin of this society. Is the time not now ripe for the formation of a Society for Instruction in Practical Hygiene? The stopping of a hemorrhage or the resuscitation from asphyxia by artificial respiration is most dramatic and the results are the more gratifying because so evident, but nevertheless the intelligent prevention of disease by a knowledge of the manner of communication is fully as important and could be made of use every day by every member of the society. The wide dissemination of an understanding of the practical laws of hygiene would be of more weight with legislative bodies toward the enactment and fulfilment of sanitary laws than any amount of political maneuvering. Six or eight lectures would give a class a correct and working idea of the general principles of preventive medicine. Physiology, therapeutics and materia medica would all need some attention. The idea being, not to teach how to diagnose or how to prescribe drugs, but rather to explain the difficulties encountered by the physician; that what the patient often considers the disease is but a symptom and that the dose for one man may be double what another man needs, or not the right drug at all, even though they are both suffering from the same malady. Bacteriology would be given a great deal of attention and the diseases caused by a known micro-organism could be studied more in detail. The various processes of sterilization, and the practical ways of preventing the spread of tuberculosis and typhoid fever, would, of course, be of great value to every one.

MARRIAGE, INSANITY AND THE LAW.

THE law-makers of the State of Minnesota are contemplating a step to check insanity by making it illegal to marry without a physician's certificate as to the saneness of mind of the contracting parties, and the soundness of intellect of both their families. At first sight it seems somewhat difficult to legislate for such an end, for here the physician must certify that no brother or sister, father or mother or even grandfather or grandmother, was afflicted with chronic imbecility or insanity; and the minister who marries two people without such a certificate showing a sound condition of mental health in both families is liable to a fine of $1,000, or not more than five years' imprisonment.

Whether or not the bill, if passed, will fit all cases, or whether it will force a large number who have afflicted relatives to take a wedding trip to another State for the marriage ceremony, is not the issue. There are so many exceptions of congenital or accidental insanity, of epilepsy not due to hereditary causes—in fact, good authorities ascribe the affection in nearly 70 per cent. of the cases to trauma during birth—and of imbecility that has no connection with the family history, that the law would undoubtedly strike many whose marriage might be perfectly safe.

The real issue is, will such a law tend to decrease in the coming years the increasing number of those who are now flocking to the insane asylums of the State? Senator Chilton who introduced the bill and many of the physicians of the State who are strongly in favor of its passage, urge that it will be of undoubted benefit, as so many of the children that become public charges are the offspring of parents who were, either or both, tainted with insanity or imbecility.

The fact that the thoughtful consideration of *mental health* which physicians have so often, but vainly, urged, has become a sentiment so widely spread as to enable a bill to pass the Senate of the State is at least a sign of a popular awakening to a realization of the

horrible statistics of the slow but sure results of such indiscriminate marriages.

If there were any way of shortening the effect of time and presenting human experience to individuals in a rapid series of vivid consecutive pictures of cause and effect, the people would be the first to cry out for laws to protect them. No one questions the laws that prevent leprous, cholera and plague patients from entering our communities and mingling with the people, because the fatal consequences follow so quickly that the people learn their object lesson with revolting horror. But could they see in as many days, as it takes years, the development of insanity, the slow, pitiful suffering of the unfortunates and the horror and anxiety and heart-break of their friends in the cases that spring, with the fatal regularity of statistics, in the children and grandchildren and great-grandchildren of a person who has insanity in his family, if these could be presented to the people as vividly as the physician sees them, there could be no more telling object lesson, and one would as readily share his marriage-bed with a leper or a plague-patient as with a person directly tainted with insanity.

Although the law may bungle, and the neighboring States may help people to evade it, yet it is sentiment in the right direction, for if the problem of heredity could be cut out of insanity half of the existing asylums might be turned into "fresh-air" resorts.

ECHOES AND NEWS.

NEW YORK.

Roosevelt Hospital.—It is reported that Dr. Walter B. James has been appointed as Visiting Physician to Roosevelt Hospital to succeed Dr. Francis Delafield.

Anti-Hypnotism Bill.—The bill of Mr. Babcock aimed at the practice of hypnotism, mesmerism, suggestive therapeutics, and allied phenomena was the subject of a hearing before the Assembly Public Health Committee on Wednesday.

Reception to Dr. Dana.—The Medical Club of Philadelphia gave a reception to Dr. Charles L. Dana of this city Friday night, March 29th.

Secretary of Health Bureau.—Dr. Daniel Lewis, of New York, State Commissioner of Health, has appointed Dr. William E. Johnson, of Waverly, Tioga county, formerly State Senator, as Secretary of the Bureau of Health. The salary is $2,500 a year.

West Side Burglars.—Those burglars noted in the MEDICAL NEWS of last week entered the house of Dr. Brill this week and stole some valuable jewelry.

New York Academy of Medicine.—At a stated meeting of the Academy on April 4th, the order will be as follows:— Subject: "The Duty of the Public to the Medical Profession." Paper by D. B. St. John Roosa, M.D., LL.D.; paper by W. H. Thomson, M.D., LL.D.; discussion by Drs. A. H. Smith, F. R. Sturgis, A. Jacobi, F. P. Kinnicutt, and others.

The American Laryngological, Rhinological and Otological Society.—Owing to an oversight the dates selected for the Annual Meeting of the American Laryngological, Rhinological and Otological Society are the same as those of the American Climatological Society. The American Climatological Society is to meet in Buffalo, and, owing to the crowded condition of Buffalo during the Exposition, it would be difficult for them to change their date. It has therefore been decided to hold the Annual Meeting at the New York Academy of Medicine in the City of New York on May 23, 24 and 25, 1901.

Certificate for Pure Milk.—The Milk Commission of the Medical Society of the County of New York had a meeting last week at the Academy of Medicine. About forty milk dealers were there. The commission agrees to guarantee or certify the milk of all dealers desiring such certificate. The standard required will be that the acidity must not be higher than .2 per cent. and that the milk must not contain more than 30,000 germs, or bacteria of any kind, to the cubic centimeter. The butter fat must reach 3.5 per cent. Labels will be supplied to dealers who pay for the cost of inspection.

PHILADELPHIA.

Epidemic of Pinkeye Threatened.—A number of cases of this disease have lately appeared and it is apparently increasing in prevalence, one practitioner having seen six cases in one forenoon. The city has not had a severe epidemic of this disease for several years.

Hospitals to Receive Little State Aid.—The chairman of the State Legislative Appropriation Committee has stated that the appropriations for hospitals this session will be cut down because of the heavy expenses connected with the new State Capitol at Harrisburg. In addition to the charge against the West Penn. Hospital in Pittsburg, noted in this column recently, a number of Grand Army men have filed a complaint that Grand Army members are turned away from the institution though there is a fund supposed to be expressly for their care at this hospital. Charity patients have also made complaints. Inquiry may terminate in a formal investigation.

Dr. Wyeth to Speak in Philadelphia.—The guest of honor at the Academy of Surgery April 1st will be Dr. John A. Wyeth of New York, who

will read a paper on "Amputation at the Hip-Joint for Sarcoma; the Tendency to Recurrence."

Pennsylvania Hospital Officials Answer Mandamus.—The authorities of the Pennsylvania Hospital in answer to the demands of the court in the case of Miss Mariane H. Wood, the nurse who seeks reinstatement, state that they are not legally bound to reinstate Miss Wood, because she was an employee, subject to discharge at the discretion of the officials. The hospital was incorporated solely for the purpose of caring for the sick and insane and the training school for nurses is not a "third department" of it. They deny that Miss Wood has had no hearing nor opportunity for hearing and also refute her claim of a conspiracy against her.

Forceps as Rotators.—At a recent meeting of the County Medical Society Dr. Richard C. Norris spoke on the management of cases of arrested posterior position of the vertex. In the hands of the general obstetric practitioner podalic version is the best working rule. In cases where forceps are necessary Dr. Norris has for the past three years been using them as rotators with gratifying success. No extensive lacerations of the soft parts are caused and the child is exposed to no greater danger than by other procedures. The Tucker solid blade instrument is used for this purpose.

Partial Hysterectomy for Necrosis of the Uterus.—Dr. Barton Cooke Hirst reports two cases of recovery from streptococcic puerpural infection and necrosis of the uterus which he believes were due to the character of the operation employed. Only the softened, necrotic area of the uterus was removed instead of doing a total hysterectomy as formerly. The procedure is offered as being more quickly and easily done and productive of less shock to the patient.

Neurological Society.—At the meeting of March 25th Dr. F. X. Dercum exhibited an interesting case of epiphysitis with hysterical joint manifestations added. The patient was a man of thirty-seven years who has had pain in the left shoulder since he was ten years of age. The upper half of the left arm is more than two inches shorter than the right. This is the third case of epiphysitis with arrested development coming under the notice of Dr. Dercum, one of the others following an attack of scarlet fever.

Dr. William C. Pickett read a report of observations concerning the scapulo-humeral reflex of Von Bechtern. Studies were made on 122 cases of hemiplegia, tabes, etc. In 40 cases the reflex was not obtained. Dr. Pickett found that adduction and external rotation which are Von Bechterew's typical signs were not so common as were abduction and slight flexion of the elbow. The presence of the reflex is considered significant, but its absence is of uncertain value.

CHICAGO.

Vaccination Decision.—Judge Dunne has decided that school authorities have no right to exclude from the schools children who have not been vaccinated, unless an emergency which necessitates guarding from smallpox is shown to exist.

Chicago Medical Society.—At a meeting, held March 20th, the subject for discussion was neurasthenia. Dr. L. Harrison Mettler read a paper on the pathology of neurasthenia in which he took the ground that this, like all the so-called neuroses or functional diseases of the nervous system, has a pathology because function and structure are so intimate and interdependent that disturbance of the former presupposes alteration of the latter. The pathology of neurasthenia is confused, even in its conception, by the uncertainty surrounding the meaning of the word neurasthenia. Nerve exhaustion, if secondary, is often only the manifestation of deleterious influences, both inside and outside of the body, upon a sympathetic and highly responsive nervous organism. Such a neurasthenia will, of course, include in its pathological findings many extra-neural alterations, such as anemia, hyperemia, enteroptosis, auto-intoxication, gastro-intestinal catarrh, blood changes, phosphaturia, oxaluria, and almost every known pathological condition, local and general, familiar to medicine. Therefore, in true primary neurasthenia the pathology must be sought in the molecular or chemical conditions of the nerve elements or neurons. Little that is certain is known about these intraneural changes. As to the pathology of the congenital form of neurasthenia, one can say absolutely nothing. There is a pathology, therefore, of nervous exhaustion, but knowledge of it, at the present time, is only a matter of inference, founded upon experimental research.

Etiology of Neurasthenia.—Sanger Brown stated that refinements in business methods, with the development of devices providing means of constant intercommunication, expose the business man to incessant drafts upon his capital of nervous energy; while keenness of competition, the added responsibility of success, as well as the anxiety and depression incident to failure, all contribute to nerve bankruptcy. Indeed, in this connection the excessive indulgence in venery, sometimes practised by the overworked business or professional man, might consistently be termed neurogenic defalcation, or in lesser degree peculation. But if the increasing complexities of modern civilization offer a menace to the neurons of business and professional men which may fairly excite concern, what shall be said of their effect upon the neurons of the modern society woman, with her perpetual breakfasts, luncheons, receptions and card parties; her clubs with their educational, municipal and philanthropical departments? And even under the weight of these great burdens, yielding to primitive impulses, she may attempt to divert some energy to the family circle, as, for instance, personal supervision of the housekeeping, the training and education of her children, etc. In her efforts to meet all these demands, besides many others, her liability to

neurasthenia is positively alarming, and accordingly sooner or later she is likely to register at a rest cure. Some of the severest cases of neurasthenia develop rather rapidly after an emotional or physical shock, and when these causes act coincidentally, their influence is powerfully intensified. The symptoms supervene sometimes within a few hours, sometimes within a few days or weeks of the exciting cause. He has repeatedly seen undoubted cases of severe and protracted neurasthenia result from these causes alone or combined, when there could be no possible motive for deception. Now and then cases are met with in which well-marked symptoms have developed independent of any exciting cause—cases which, in the present state of knowledge, may properly be termed idiopathic. As to predisposing causes, age may be first considered. The active period of adult life furnishes a large majority of the purer cases, mainly because at this time the individual exposure to exciting causes is at its height. There is a large and perhaps increasing proportion of individuals in every civilized country, mainly among the middle and upper classes, in none of whose organs actual disease can be demonstrated. They are not insane nor yet imbecile; but they lack endurance and stamina to such an extent that they are always more or less dependent on some one, no matter what educational and hygienic advantages may have been extended to them. The condition is permanent. It may have been present from birth, in which event it might properly be regarded as congenital or hereditary; or it may have resulted from some severe disease occurring during the period of development.

Treatment of Neurasthenia.—Dr. Archibald Church read this paper. In practice male and female neurasthenics must be treated differently, although their cases may be comparatively similar. In a case of marked neurasthenia in a woman the rest cure may be undertaken with a fair prospect of its resulting favorably. The keynote in the rest cure is isolation. It is important to place the patient in an entirely different atmosphere and under different surroundings. Isolation means exclusion of the friends from the patient, the cutting off of visits, and in some cases the cutting off of correspondence with the patient. A second essential in the rest cure and management of neurasthenia and hysteria, especially neurasthenia, is to establish an atmosphere of constant hopefulness.

GENERAL.

American Laryngological Association.—The Twenty-third Annual Congress of the Association will be held at New Haven, Conn., Monday, Tuesday and Wednesday, May 27-29, 1901. The President of the Congress is Dr. Henry L. Swain of New Haven.

Discovery of Supposed New Ether.—Dr. John A. Cooke, professor of chemistry in Morningside College, of Sioux City, Ia., is said to have announced the discovery of a new kind of ether, which chemists to whom it has been submitted declare will prove of greater practical value than that ordinarily used. Its specific gravity is lower and its color is orange yellow. It has been found very effective in surgery.

Medical Society of City Hospital Alumni, St. Louis.—At the last regular meeting of this society, held March 21, 1901, the following papers were read: Dr. L. H. Behrens—A Case of Gall-Stone Impaction Simulating Appendicitis; Dr. A. E. Taussig—A Case of Duodenal Stenosis due to Gall-Stones; Dr. R. F. Amyx—(1) A Modification of the Liston Splint with Method of Application, (2) Presentation of Hospital Patients; Dr. F. R. Fry—Types of Migraine.

Quarantine Rules Modified.—In view of improved conditions in Cuba, and the fact that passengers as well as vessels are inspected before leaving Cuban ports by the United States quarantine officers, and suspected baggage disinfected, the Treasury Department has so modified existing regulations as to permit, until April 15, 1901, travel from Cuba of non-immunes after their inspection at port of departure and necessary disinfection of effects. This waiver includes the northern ports.

To Regulate Marriages.—The State Senate of Minnesota on March 23d, passed Senator Chilton's bill prohibiting the marriage of insane, epileptic, and idiotic persons, and requiring a medical certificate of all applicants for marriage licenses. Amendments were adopted making the physician's certificate not quite so sweeping, and permitting the marriage of any feeble-minded person over forty-five; the bill originally having extended such permission only to women. The bill passed by a vote of 34 to 17.

Tuberculosis in Texas Jails.—It is not generally known that Texas has isolated its consumptive convicts, thus keeping in the front rank of modern ideas regarding the treatment of this malady. Not only this, but these ailing convicts receive treatment practically similar to that followed in sanitaria for consumptives. Their diet is of a highly nourishing character, and includes stimulants. Cleanliness in quarters and the observance of sanitary precautions are imperative. When able to leave their beds, the men are required to be in the open air, and they sleep in a spacious stockade, where each enjoys as much breathing space as he would in a forest camp. No one is required to work beyond his strength, and employment is entirely in market-gardening. Yet this isolated convict farm has returned to the State in two years a net profit of about $2,500. Thus far the results of this mode of living and treatment have been of the most gratifying character. Many men who went to the farm apparently in the last stages of consumption, and who were scarcely able to feed themselves, are now hearty and stout, evincing not the slightest objective evidence of consumption, and the death rate from this disease is steadily diminishing. A

like segregation of consumptive convicts was ordered recently by the Alabama Legislature.

Lepers in the Philippines.—According to the reports of the Marine Hospital Service leprosy is widely prevalent over the entire archipelago, but the greatest number of cases exists in Southern Luzon and the southern islands. It is quite prevalent in Cebu, the number of lepers being estimated at 2,000. The total number of cases in the islands is estimated at 20,000, but the actual number is not known, and a census is difficult on account of the majority of cases being in the rural districts. The cases in Manila and surrounding country are isolated in a substantial hospital under the auspices of the Manila Board of Health. There is also a leper hospital at Cebu. An attempt at segregation and isolation of the lepers in the islands has been made by the army officials, and several months ago orders were issued from headquarters directing that a hospital in each district be set aside for the isolation of the lepers that could be apprehended, and a Board of Army Officers was detailed recently to investigate several islands for the purpose of selecting a suitable one for a leper colony, the intention being to deport all cases of leprosy to this place for segregation and isolation.

Tuberculosis Congress.—American medical scientists will be both numerous and prominent at the World's Tuberculosis Congress, to be held in London during the last week in July. Professor William Osler, of Johns Hopkins University, has been invited by the management of the Congress to organize the American contingent. Among those who have already signified their intention of coming are Dr. Trudeau, of New York; Professor Solly, of Colorado; Dr. Herman Biggs, of New York; Professor McEachran, of Quebec.

Dr. J. G. Adami, professor of pathology at McGill University, has been appointed Vice-President of the section of pathology and bacteriology of the International Congress on Tuberculosis to be held in London in July under the patronage of King Edward. Dr. Adami will attend.

Professor Koch, of Berlin, and Dr. Brouardel, of Paris, have announced their intention of actively participating. Dr. Malcolm Morris, of London, the originator and secretary general of the Congress, is reported as saying: "Certainly tuberculosis never called together so distinguished a body of international experts. Delegates will attend from probably every civilized country of the world. From the United States, it goes without saying, we expect the keenest kind of men and ideas. We have decided to establish a temporary museum, illustrative of the treatment and prevention of tuberculosis in both men and animals."

An International Sanitary Treaty.—Two South American States, Argentina and Uruguay, have agreed upon a treaty of sanitary protection, relating generally to contagious and infectious diseases, and especially to the bubonic plague. The provisions of this treaty are broad and liberal, and while guarding against undue interference with commerce, tend to the protection of both States in a very sensible and practical way. Among other things, it provides that if the plague, or any other infectious disease capable of being transmitted by sea, shall make its appearance in either country, ships clearing for the other shall be inspected and thoroughly disinfected, including the baggage of passengers if from places where the existence of the disease is known or suspected, to the end that they may sail with a clean bill of health. The treaty does not provide that the quarantine on either side shall be lax, or that any proper precautions shall be neglected, but arranges for mutual good offices for joint protection against the preventable transmission from one country to the other of diseases which may become epidemic.

American Association of Pathologists and Bacteriologists.—The first annual meeting of this association will take place next week, April 5th and 6th, at Boston. From the program issued the meeting promises to be unusually attractive. The Introductory Address will be delivered by Dr. W. T. Councilman of Boston. Some of the papers to be read are as follows: Pathology of Spleno-lymph Glands, by A. S. Warthin, Ann Arbor; Multiple Leiomyoma of the Kidney by J. H. Larkin, New York; Transplantation of Tumors by Leo Leob, Chicago; Hodgkin's Disease by C. F. Martin, Montreal; Biology of Pest Bacillus by E. H. Wilson, Brooklyn; New Formation Nerve Cells in Cerebral Tumor by W. L. Worcester, Danvers; Trichinosis by H. V. Williams, Buffalo; Growth of Bacteria on Serum Agar by E. Libmann, New York; Suppurative Pyelophlebitis by Charles Norris, New York; Sudden Death in Epilepsy by A. P. Ohlmacher, Gallipolis; Cholecystitis and Typhoid by J. H. Pratt, Boston; Liver Necroses by F. B. Mallory, Boston; Porencephaly by D. A. Shires, Montreal; Proteolytic Enzymes and Chemical Studies by E. R. Baldwin, Saranac Lake and P. A. Levene, New York; Variation in Virulence of Human Tubercle Bacilli by A. J. Lartigau, New York; Primary Endothelioma of Lung by Isaac Adler, New York; Genital Noma by George Blumer, Albany; Streptococcus Mucosus by W. T. Howard, Jr., Cleveland; Bacteriolysis and Typhoid Immunity by W. M. Richardson, Boston; Cerebrospinal Meningitis and Bacillus Pyocyaneus by R. G. Perkins, Cleveland; Bacillus Diphtheriæ by F. P. Gorman, Providence; Intestinal Bacteria by W. W. Ford, Montreal and Cholesteatomata of the Brain by J. J. Thomas, Boston.

As to Quackery.—The excellent editorial comment on this subject by the New York *Sun*, should not go by unnoticed. It shows a just appreciation of the problems involved.

"It is a curious characteristic of human nature, or of a great deal of human nature, that people who grudge paying a cent to a regular medical practitioner will cheerfully pay a great

deal of money to an irregular medical practitioner. Go where you will and you will find the quack prosperous. His rooms are full of patients and his patients are full of faith. Men and women will buy wondrous remedies from traveling mountebanks who do not disdain to sing a comic song on the wagon from which they peddle their nostrums. Natural bone-setters, and long-haired "Indian doctors," and botanic doctors ignorant of botany, and faith healers of many kinds, abound; and the trade of most of them is good. The world likes to be healthy, but it loves to be humbugged.

"If a thousandth part of the blind, unhesitating faith that cleaves so readily to incompetent and often illiterate practitioners of fantastic means of healing were bestowed upon religion there would be no complaints that the churches are not filled. But often those who are full enough of doubts of the supernatural so far as it relates to their souls are quick to believe in an almost or altogether supernatural gift of quack-salves to cure the body.

"Legislation can do but little, if anything, to interfere with the gains of the medical pretenders or of the professors of visionary and semi-religious medical 'science.' You can not legislate away a state of mind; and the state of mind of thousands, perhaps millions of persons, is one of crass credulity in humbug. Their delusions and illusions can be removed only by experience and a wider knowledge. They take their own lives and the lives of their families in their hands when they neglect the methods and the agents of modern medicine and surgery and resort to the moonshine of Christian Science or to any other crank system or to any individual quack. But you cannot prevent people from killing themselves if they have the will; and you will only stimulate faith in quackery by giving it a chance to yell 'Persecution!' A private arrangement between patient and 'healer' will nullify any provision of law forbidding the 'healer' to heal for a consideration. A gift can take the place of a fee; and 'gratuitous' treatment can be acknowledged with a gratuity.

"The best way to deal with a delusion is to let it alone. Common sense must win in the end."

A National Consumptive Sanitarium.—An official announcement, indorsed by all the Denver papers, was issued March 23d regarding the establishment of a sanitarium for consumptives. It says: "To save the lives of thousands of persons belonging to other States from death from tuberculosis is the object of an organization of Denver physicians and other professional men and women for the establishment and maintenance of the Rocky Mountain Industrial Sanitarium, which has just been incorporated here. The organization aims to be national in scope and has the indorsement and support of many of the foremost physicians of the United States. The institution is not for profit. No dividends can be declared and the net earnings will be used for the improvement and betterment of the enterprise. Its purpose is to aid the great majority of tuberculosis patients in poor or moderate circumstances who come to Colorado and other mountain States in the hope that the climate and altitude will aid in effecting a cure, and who, almost invariably, either from lack of means or proper direction, are immediately surrounded by conditions which preclude improvement or recovery.

The plan provides for the erection of a sanitarium about twenty miles from Denver, to be conducted as an industrial colony. A large amount of money will be required. This, it is expected, can be raised by the 'cottage endowment plan.' To secure these endowments by individuals, fraternities, clubs, societies, churches, colleges, alumni, labor unions, etc., the Young Woman's Sanitarium Auxiliary has been organized. A branch of the auxiliary will be established in every city and town in the United States. By utilizing the labor of patients it is expected that nearly all the work of the institution will be performed, the entire sanitarium supplied with provisions and a great variety of remunerative industries carried on. The industrial nature of the institution will enable patients to avail themselves of a change of climate while the disease is in its incipiency and before they are incapacitated for light, open-air employment."

A Tuberculosis Conference at Ottawa.—According to the Marine Hospital reports, the prevalence of consumption throughout the Dominion of Canada has become so great as to cause alarm among all classes of people. Less than two months ago, in response to public demand as expressed through the press, Governor-General Earl, of Minto, called a public conference to meet in Ottawa on February 14th to consider what means should be taken in order to overcome the ravages of tuberculosis. Invitations to this conference were issued by the governor-general to representative people all over Canada—ministers, physicians, lawyers, and statesmen. When the conference assembled there were found to be present over 500 participants. It was formally opened in an address by the governor-general, and Sir James Grant was made the permanent presiding officer. In the governor-general's address it was stated that the death rate from consumption was steadily growing, and in the Province of Ontario alone, between 1867 and 1898, had amounted to no less than 32,000. Although statistics are not available, the death rate from consumption in the Province of Quebec is even greater than in Ontario. The annual estimate of deaths from consumption for the whole Dominion is placed at between 7,000 and 8,000. According to Sir James Grant's statement, tuberculosis carries off

more than 5,000,000 of the human race annually.

The conference continued in session three days, and the discussions were most interesting from beginning to close. Dr. Fraser, of Brandon, representing the Indian department of the Federal Government, spoke of the awful prevalence of tuberculosis among the Indians. From his own observation he confirmed that 95 per cent. of the sickness among the aborigines was tuberculosis in some form or another, and worse still, the fatalities were practically 100 per cent. of those affected. In fact, the race was dying out in consequence.

Resolutions were adopted demanding that the Government take measures to prevent the entrance into the Dominion of tuberculized immigrants and tuberculized cattle.

An association was organized, the official name being "The Canadian Association for the Prevention of Tuberculosis." The objects are stated to be, generally, to combat and prevent tuberculosis in the Dominion of Canada. Specifically: (1) To enlighten and educate the public in regard to the disease and the principles of prevention and cure. (2) To influence legislatures to do all within their power to assist in means of prevention and cure. (3) To encourage the erection of sanatoria within reach of the people, and the passing and enforcing of adequate sanitary laws. (4) To take means to arouse sufficient interest until governments, municipalities, and people are brought into such systematic cooperation as to make full provision for the whole of the people.

The above purposes to be accomplished by (1) The establishment of a central office for the preparation and distribution of suitable literature and for correspondence. (2) The institution of public lectures. (3) Articles in the press. (4) Periodical congresses and an annual report. (5) Appealing to every province and territory to inaugurate local associations to carry the work into every municipality. (6) Appealing to life insurance companies, benefit societies, etc., to make proper protection to non-tuberculous insured.

Obituary.—Dr. George Wren, the house physician at St. Vincent's Hospital, New York, died there last week of typhoid fever. He was born in Bridgeport twenty-seven years ago. He was a graduate of Fordham College and in 1899 was graduated from the Bellevue Medical College, going at once to St. Vincent's Hospital. He was appointed house physician in January. His father, Peter W. Wren, is President of the Board of Health in Bridgeport.

Dr. William Francis Channing, noted scientist and son of the philosopher; Dr. William Ellery Channing, and cousin of the late Rev. William Henry Channing, once Chaplain of the United States Senate, died at the Perry Hospital March 20th. Dr. Channing was born in Boston and was graduated from Harvard in 1839, being a classmate of Dr. Edward Everett Hale. He later took a course in medicine at the University of Pennsylvania, receiving his diploma in 1844, but never practised.

Dr. Richard K. Valentine, fifty years old, committed suicide last week at his home, 190 Lincoln place, Brooklyn, by cutting his throat with a lancet. About a week ago he was prostrated by a severe attack of the grip. He was under the care of several physicians and two trained nurses. He became delirious last night, and the nurses were constantly at his bedside, but in spite of them he managed to kill himself.

Dr. John Henry Hobart Burge died last week at his home, 132 Montague street, Brooklyn, of heart disease. He was born at Wickford, R. I., in 1823. His father was the Rev. Lemuel Burge, who was pastor of the Narragansett Church. Dr. Burge was graduated from the College of Physicians and Surgeons in this city. The following year, 1849, as surgeon on the bark "Ann Welch" he made a trip around Cape Horn to the gold fields of California. While in San Francisco he founded the first hospital there. He returned to Brooklyn in 1851 and had practised medicine there ever since. He was consulting physician at the Long Island College Hospital and St. John's Hospital. He was a charter member of the Practitioners' Club.

Dr. Mary F. West, one of the oldest women physicians in this city, and a graduate of the Woman's Medical College of the New York Infirmary, died suddenly at her home, No. 122 East Twenty-eighth street, last week. Dr. West, who was sixty-one years old, had practised in this city for more than twenty years.

Dr. S. Edgar Mortimore of New York City died on the operating-table at the Church Hospital in Orlando March 22d. Dr. Mortimore was born in New York in 1850. He attended the public schools and was graduated from the Eclectic Medical College in 1871. He was afterward Professor of Anatomy in that college and a practising physician in Harlem for thirty years.

Dr. Ralph J. Hess, twenty-seven years old, died this week in the scarlet-fever hospital on North Brother Island. Dr. Hess joined the Bellevue Hospital staff on June 1st last. He was taken sick last Monday night and no alarm was felt until the following day when he developed symptoms of scarlet fever. He was then removed to the Willard Parker Hospital, but owing to the crowded condition of that hospital he was removed to North Brother, where he died.

EMERGENCY HOSPITAL AT THE PAN-AMERICAN EXPOSITION.

AN attractive and useful feature of the Buffalo Exposition will be the emergency hospital, which is illustrated here. It is to stand at the west end of the Mall. In conformity to the general architectural scheme of the Exposition build-

ings, the free Spanish Renaissance type of treatment has been followed.

It is to have a frontage of about 90 feet on the Mall; and in the main is but one story high, but it covers a considerable ground floor space. Modern arrangements that are both convenient and sanitary mark every feature. Approved medical and surgical appliances have been most carefully selected especially for their adaptability to emergency work and the exigencies that are likely to arise. The first floor front contains in the extreme western wing, two male wards with seven cots each, a bathroom, physicians' office, a morgue and a linen-chest. The eastern wing contains a woman's ward, large enough to hold a dozen cots, with direct communication to the woman's bathroom. Dr. Roswell Park is the Director; Dr. Vertner Kenerson, Deputy Director, and Dr. Alexander Allen is the resident physician.

In regard to the importance of this adjunct to the Exposition it may be said that up to March 1st five hundred and four cases have been treated on the grounds, only one of which proved fatal. These include all forms of sickness and accidents to workmen employed upon the construction work. In this connection it is well to note that the number of cases treated at the Omaha Exposition was about three thousand, while the history of the hospital at the World's Fair in Chicago gives a total of 11,602 medical and surgical cases treated, resulting in 69 deaths.

It is hoped to have less use than this for the hospital at the Pan-American, though in the immense crowds which will attend, no doubt, many individuals will have occasion to appreciate the provision that has been made in this direction.

Plague's Ravages in India.—The Calcutta correspondent of the *Daily Mail* says: "Eight thousand people died of the plague last week in Bengal alone, including Calcutta. Whole towns are being deserted."

Bell Bill Withdrawn.—Dr. Nelson Henry has withdrawn the much modified and discussed Bell Bill. It was found to be impossible to please all the various interested parties and it is understood that a new bill is contemplated.

CORRESPONDENCE.

OUR LONDON LETTER.

[From Our Special Correspondent.]

LONDON, March 16, 1901.

"THE DUMMY CORPSE"—THE OUTBREAK OF SMALLPOX [redacted]SGOW—THE HOSPITALS COMMISSION—T[redacted]OUSING OF THE POOR IN LONDON—INCREASE OF ALCOHOLIC LUNATICS IN SCOTLAND IN CONSEQUENCE OF THE PROSPERITY OF THE COUNTRY—THE NEW SYDENHAM SOCIETY—DECLINE OF MEMBERSHIP—PROPOSED ATLAS OF DIAGNOSIS IN MEDICINE, SURGERY AND OBSTETRICS.

MR. MARSH, the practitioner who was in attendance in the "dummy corpse case," which I have already described in a previous letter, has contributed to the *Lancet* a complete account of this extraordinary fraud. I need now only summarize the additional points narrated by the doctor. The patient was a man, aged thirty-five, who called at the doctor's office on January 14th complaining of difficulty of micturition. Mr. Marsh prescribed for him and did not see him again until the 25th. On the 29th the doctor was summoned and found him in bed in a very weak state, with a temperature of 103°. He complained of severe pains in the loins and constant headache and said that his feet and legs swelled when he was out of bed and that for some time he had been frequently passing small quantities of porter-colored urine. He remained in bed for the following eight days during which the doctor visited him regularly and obtained samples of his urine daily. It was acid, specific gravity 1026, and always contained considerable quantities of albumin. On one occasion the reaction for blood was obtained and there were numerous hyaline and some granular tube casts. On February 4th the albumin had largely increased and the patient was very collapsed, deadly pale almost pulseless, and suffering from a severe rigor. He said he would send for his brother and wrote a letter to him which the landlady posted. On Feb-

ruary 5th he appeared to be very drowsy and showed convulsive movements of the limbs. Fearing uremia the doctor tooks measures accordingly and saw the patient at night again. Though free perspiration had been induced the drowsiness continued and with difficulty could a reply be elicited. Next morning a man much resembling the [redacted]nt called on the doctor stating that "his [redacted]er" had died at 4 A.M. in a fit and gave a description of a uremic convulsion. He wished "the body" to be removed lest it should be an inconvenience in the house. Later in the day the doctor visited the house and found "the dummy corpse" described in my previous letter. On being arrested the patient confessed that he added albumin to his urine, but said that he had been very ill. For obtaining a death certificate by false pretences he was sentenced to nine-months' inprisonment.

The official report shows that in Glasgow during the past week 130 fresh cases of smallpox were admitted to hospital, of which 90 were dismissed cured and 10 deaths occurred. The number of deaths since the beginning is 134 and the greatest number of cases in hospital at any one time was 456, on February 8th.

In reply to a question in the House of Lords, Lord Raglan, Under Secretary for War, said that the report of the Hospitals Commission was very important and lengthy and that the Government had hardly time to digest the suggestions, but they were fully alive to the importance of thorough reorganization of the Army medical system, and that they would avail themselves of advice from the heads of the profession or other sources.

The housing of the poor has now become a burning question in London. The working man, unless he lives miles from his work, must pay an exorbitant rent for one room in a small house inhabited by two or three other families. The poorest class pay a high rent for a single room out of a starvation wage. From earnings of six, eight, or nine shillings a week gained chiefly by women who form the huge army of boxmakers, artificial flower makers, belt and umbrella makers, paper-bags, etc., as much as three or four shillings are paid for a single room. The London County Council has in hand 37 schemes for the erection of artisans dwellings of which several represent the abolition of insanitary areas. It has provided accommodations for 32,000 persons and is committed to build dwellings for 12,000 more. It is well known that the King takes a great interest in this subject. When Prince of Wales he presided at a Commission which investigated the problem of the housing of the poor.

At the annual meeting of the Royal Edinburgh Asylum for the Insane, the largest establishment of its kind in Scotland, Dr. Clouston the superintendent said that the admissions to the asylum for the past year constituted a record and that the excessive use of alcohol during a period of brisk trade and high wages had to a large extent been the cause of an undue amount of mental disease. His alcoholic lunatics had risen from an average of 15½ per cent. in 1874-88 to 24½ per cent. in 1900. All this apparently resulted from the prosperity of the country. Yet the politicians said they could do nothing. The author is convinced that some day they would have a big reckoning. A consumptive race might conceivably be cured in two generations, but a drink-sodden race could not be cured in 100 years.

The New Sydenham Society which is now in its forty-third year is in financial difficulties. It was founded with the object of publishing translations of most important medical works which appeared in foreign languages and has done excellent service, giving for an annual subscription of five dollars usually about three volumes. In its palmy days its list of members was as high as 3,000; it is now only 1,400. Mr. Jonathan Hutchinson who has been Honorable Secretary since the foundation explains that this decline is due to perfectly natural causes. The condition of medical journalism and of the publishing trade has declined in the Society's lifetime. The supply of medical literature is now very liberal and works of real merit published abroad do not now wait long for translation. The Society cannot possibly compete with private enterprise in promptitude. In brief the *raison d'être* of the Society has to a large extent been removed. Of late the Council has had increasing difficulty in finding works for translation which should fulfil the two needful conditions of being at once of great permanent value and likely to be acceptable to a wide circle of readers. Works such as those of Trousseau, Hebra. Charcot and Hirsch are no longer available. There are plenty of valuable monographs on special subjects, but they would interest only a few. The question of winding up the affairs of the Society has therefore been under consideration; but before doing so it has been determined to endeavor to publish an "Atlas of Pictorial Illustration of All Subjects Relating to Diagnosis in Medicine, Surgery and Obstetrics. It is calculated that if 2,000 subscribers could be obtained 4 or 5 fasiculi of from 8 to 10 plates each could be produced annually and that the work could be completed in five years.

TRANSACTIONS OF FOREIGN SOCIETIES.

British.

ENTERECTOMY — PYONEPHROSIS — FIBROMATA — SCARLATINA.

A. G. BARKER, at the Royal Medical and Chirurgical Society, February 26, 1901, reported two cases of enterectomy to show the limita-

tions of this operation. The first patient was a woman, fifty-eight years old; multiparous; glycosuric to six per cent. of sugar; afflicted for nine months with indefinite abdominal discomfort increasing to decided pain and obstinate constipation; admitted to the University College Hospital, October 3, 1900. At that time she showed a tender tumor above and to the left of the umbilicus, fist-size, movable, little affected by distending the stomach, but displaced into the right iliac fossa by filling the colon with air, and therefore indicating colonic obstruction, probably cancerous with more or less intussusception. Her generally favorable condition warranted an operation, at which five inches of the colon were removed, October 25th. She showed an excellent reaction from the operation, a temperature of about 100° F. for the first nine days, assimilated rectal food for the first four and small quantities of fluid from the second day onward by the mouth, she bore morphine, three to four times daily for three days, and then phosphate of codeine, in grain-doses hypodermatically thrice daily, combative of her glycosuria, which at this time had reached its maximum, 6.6 per cent. This condition speedily disappeared altogether under the drug and diet. Once she surreptitiously ate sugar and grapes and next day showed 2.8 per cent. of sugar, but again recovered from it. Her recovery from the operation was steady and, except for some sloughing of the mesentery, uneventful. Very evidently there are glycosurics who repaid well operative damage. The second case was a robust woman, seventy-six years old, with a strangulated ventral hernia through an ovariotomy scar since 1870; no children; multiple large fibroids of the uterus; admitted January 10, 1901, to the hospital with the classical symptoms of strangulation persisting during the 8th and 9th. Upon exposing the hernia, a pint of intensely fetid, fishy fluid gushed out, three feet of the small intestine herniated through the omentum showed little luster, no cracks of the serous, punctate ecchymoses, subserous thrombosis, distention and practical gangrene. Five and one-half feet were resected, end-to-end anastomosis with the Murphy button was quickly done. From beginning to end the procedure occupied sixty-three minutes. Normal salt solution was slowly injected subcutaneously during the operation. Recovery was perfect. It seems that these resections show that some bear them well and that in children a compensatory hypertrophy of the remaining small intestine occurs to account for the large loss they sometimes bear.

F. W. PAVY in the discussion said that operations upon diabetics of the alimentary type succeed, but fail in the combined type. In the former, diet corrects the disease; in the latter, noxious matters like acetone and diacetic acid as well as sugar are in the blood.

T. SMITH recorded a case of a man not previously known to be diabetic, who after scratching his finger promptly died of septicemia and gangrene of all four extremities of a malignant, rapid type.

A. DORAN, at the Medical Society of London, February 25, 1901, reported a case of painless, feverless pyonephrosis, treated successfully by nephrectomy. The woman was thirty-eight years old, mother of eight children, always healthy up to a year ago; soon after marriage was attacked by a purulent vaginitis contracted from her husband who had strictures and cystitis. Her last child was born five years and a half ago. The history reported a mass in the right side causing discomfort when her corsets were on, but without sensation when undressed; denied hematuria, renal colic, fever and chills. There was albumin in the urine occasionally. There was a large movable kidney in the right side. Through a Langenbeck incision, the kidney was easily removed. A complete and prompt recovery followed. The organ was cystic, purulent and calculous. Evidently the gonococcus in ascending infection was at the bottom of this trouble.

A. H. N. LEWERS read a monograph on fibromata of the cervix. These occur much less frequently than do those of the body of the uterus, usually solitary, occasionally multiple, present as subserous, interstitional, submucous or polypoid varieties. When their size is considerable they always displace the fundus upward which may be palpated as a mass on the top of the tumor at the neighborhood of the umbilicus. Under such conditions of size the neighboring viscera always give symptoms, the rectum constipation, the bladder frequency of urination, the ureters compression. The uretus is variously affected. Menorrhagia is the rule, but amenorrhea for long periods of time may occur. The author then presented four specimens of these tumors, which tended to demonstrate his points. The first uterus had a large anterior solitary interstitial fibroid which had made the patient profoundly anemic through menorrhagia. The next organ had a single large posterior tumor, which caused at times painful urination, at times involuntary flowing of it, almost total amenorrhea as the woman had menstruated only twice in two years. In these intraperitoneal hysterectomy *per abdominem* was signally successful. The third patient underwent abdominal hysterectomy for the removal of a nine-pound-eight-ounce subserous fibroid which had stripped off the serosa from the recto-uterine and left iliac fossa and intervening walls of the pelvis, obliterating the peritoneal cavity in this region and displacing the sigmoid colon to the right side from the level of the umbilicus downward. A stump of the cervix was also left in this as in the other two cases and recovery followed. The fourth

womb showed a large sinistro-posterior subsero-interstitial fibroid, with a left ovarian cyst all successfully treated by panhysterectomy. The diagnosis of these tumors rests upon a patent os exterium and a palpable intracanicular tumor. A careful distinction between these and submucous fibroids of the body must be made, because the latter can be removed by pieces, but in the cervix this is disastrous.

A. NEWSHOLME, at the Epidemiological Society of London, February 15, 1901, discussed scarlatina, its epidemiological relation, especially as regards the influence of isolation upon it. That a specific organism not yet isolated with absolute scientific accuracy is the cause of this disease is certain; because it is killed by heat and other powerful disinfectants and is transmitted by personal contact and intercourse, by fomites and such media as milk. Until the life history of this germ is discovered and described our duty remains to combat it by isolating diseased patients and by disinfecting and destroying contaminated materials. One feature already established is the cyclical recurrence of periods of maximum and minimum prevalence and mortality. These vary from year to year, but do not correspond year for year in one town compared with others.

In England from the years 1859 to 1883 the mortality had never been less than 0.28, except in 1873, following excessive mortality in 1872, it was 0.19, in 1884, 0.36, and has since reached 0.08 per 1,000 as the minimum. This improvement was partly, but not wholly ascribable to the use of isolation hospitals, because in towns where no such institutions existed, a similar improvement had been seen in certain years. The very low mortality in such places immediately after periods of great or excessive death-rate could be explained on the basis of exhaustion of all susceptible material. It is peculiar that when such respites from scarlet fever occur, there is almost always an outbreak of bad diphtheritis. This has occurred so frequently as to suggest, but not yet consistently enough to prove a correlation between these two diseases. To assume that the present slight prevalence is due entirely to the isolation process would be erroneous, although it has secured better conditions in towns of good sanitary conditions over those of equally good conditions, but without isolation hospitals. Isolation in most houses is not possible, therefore the hospital is justifiable. An attenuation of the virus is the other factor now at work to determine the low fatality, just as early in 1900 it existed and led one observer to conclude that the depletion treatment was the cause. A recurrence of the virulent type corrected his opinion. Nevertheless isolation is a safeguard, and should be adopted by all advanced and civilized communities.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE—SECTION ON PEDIATRICS.

Stated Meeting, Held February 14, 1901.

William L. Stowell, M.D., Chairman.

Vomitus Nervosus.—Dr. Louis Fischer presented a girl of thirteen whom he has had under observation for six years, and in whom attacks of nervous vomiting have occurred as often as five or six times a week during that period. The first quest in the case is naturally as to whether it is a case of ulcer of the stomach. But all the pathognomonic symptoms of ulcer are lacking. The pain, or rather discomfort, that precedes the vomit is not acute, but rather an uncomfortable feeling. The tenderness is not localized at one point, but is over the whole stomach. Digestion seems to be considerably interfered with and the food is often but slightly changed when it is returned. Though there are practically no stigmata of general hysteria, Dr. Fischer is inclined to think that this vomiting is nervous in origin and has a hysterical condition for its basis.

Dr. Einhorn said that the condition is evidently not due to ulcer of the stomach since the pain is not localized at a particular point, but is felt all over the epigastrium. The periodic recurrence of the paroxysmal vomiting points to an underlying nervous condition.

Hyperesthesia of the Stomach.—Dr. Einhorn said that a marked hyperesthesia of the stomach mucous membrane is sometimes a stigma of hysteria. It corresponds with the occurrence of hyperesthetic patches in the skin. Usually this hyperesthesia is associated with some disturbance of the gastric secretions.

Where hyperchlorhydria exists pain occurs not immediately after eating, but later in the course of digestion. The treatment of the condition requires above all that the child shall be encouraged to keep back the vomiting as much as possible and her general system properly toned up. On days during which paroxysms are to be expected ferments should be administered. Between the paroxysms tonic stimulants are indicated.

In concluding the discussion Dr. Fischer said that there is a general tendency to hyperesthesia all over the child's body and the gastric hyperesthesia seems only a part of this. The stomach contents have frequently been examined and were usually found to be normal. Occasionally an excess of hydrochloric acid was found. The most successful treatment consisted in the administration of nerve sedatives, such as the bromides and morphine.

Infantile Diabetes.—Dr. William E. Young

reported a case of diabetes in a child under one year of age. When the child came under examination the specific gravity of the urine was 1,030 and it contained 5 per cent. of sugar Moreover, the infant was passing about double the normal amount of urine. A certain amount of albumin and some casts were found in the urine, though the nephritis seemed only to be due to irritation on account of the amount of sugar passed. On palpation the liver was found to be considerably enlarged and the kidneys seemed to be about four times their normal size. When the case came under observation the physical signs of diabetes had existed only for about a month. The child was very markedly marasmic. Its skin was dry and it suffered from thirst. Death took place in about four weeks. Codeine was administered very freely, but seemed to have no effect either on the amount of urine passed or on the amount of sugar. At the autopsy marked hyperemia of the kidneys was found and these organs were more than double their normal size. Unfortunately the kidneys were inadvertently thrown away..

Origin of Infantile Diabetes.—In these cases there is usually a history of diabetes in the family. Pavy has noticed the influence of this even as far as the third generation. No family history of diabetes existed in this case. At times during scarlatinal nephritis, glycosuria occurs. The same thing is true of whooping-cough even when it is not complicated by nephritis. Careful study has shown in considerably more than half the cases of whooping-cough that there is some sugar in the urine. It is probable that some infectious agent may be the cause of the rapidly-fatal diabetes that occurs in children.

In the discussion Dr. Fischer said that he has recently had under observation two children of respectively eight and six years, who suffered from glycoruria for several months after an attack of pneumonia. This fact is to be borne in mind when examinations are being made for life insurance, for, shortly after recovery from one of the infectious fevers, patients may be refused who would be otherwise good risks.

Dr. Stowell said that he had seen the case reported by Dr. Young and that its marked features were the drying up of the patient, the enlarged kidneys and liver. It seems unfortunate that microscopic examination of these organs was not obtained, as some light might have been thrown on the origin of infantile diabetes.

Milk Modification Apparatus.—Dr. Charles Hermann presented a simple apparatus for the modification of cow's milk for baby-feeding. Any milk-modifying apparatus should present three requirements, First, it should not be expensive; second, it should not be too complicated; and, third, it should admit of easy changes of formula. In this apparatus advantage is taken of the fact, demonstrated by Dr. Holt, that the cream rising to the top of the milk furnishes a ready standard for the determination of the amount of fat that a milk may contain. Dr. Hermann's apparatus consists of a graduated cylinder mounted on a stand and with a stopcock at the bottom. The cylinder is graduated from the bottom up so as to show the amount of milk that is still in the cylinder and not how much has run out. The milk is allowed to stand in it for some hours until the cream has risen. It is then drawn off. A very simple calculation enables one to decide just what is the proportion of fats and proteid material in the milk. The apparatus may also be used in determining the quality of a milk. The instrument being graduated to 1,000 c.c. the proportion of cream can be read off directly. Besides this a comparison of the specific gravity of the whole milk and of the under milk shows the richness of the product.

Vacination Clinically Considered.—Dr. Frank S. Fielder then read a paper on this subject. (See p. 490.)

Remarks on the Preparation of Vaccine.—Dr. John H. Huddleston read this paper. (See p. 503.)

Vaccine Organisms.—Dr. Anna Wessels Williams said that 130 papers have been written during the last fifteen years describing supposedly specific organisms that occur in vaccinia. Fifteen of the investigators were sure that they had succeeded in isolating the specific microbic cause of the disease. These specific micro-organisms were of all kinds, forms, and types. There were bacteria, ferments and protozoa. All these supposed discoveries with one exception have been rejected by critical bacteriologists. Some of the reported results that are constantly cropping up in the medical journals are amusing for their utter ignorance of the results obtained by others. Only last May an investigator seriously claimed to have discovered the bacillus of vaccinia. Any bacteriologist at all familiar with the subject recognized at once that the organism to which this writer referred was an ordinary saprophyte that is practically always found in vaccine material.

The Question of Protozoa.—The claims of only one micro-organism have not been disproved. This is seen in certain appearances which are found in epithelial cells in the neighborhood affected by vaccinia. When vaccine material, containing these appearances within the cells, is inoculated into the cornea of rabbits corresponding changes occur in the corneal cells. It is as yet an unsolved problem as to whether these appearances are due to micro-organisms or are merely degenerative tissue changes. Pfeiffer claims that these appearances are due to a protozoon, the presence of which is to be detected in the lesions of vaccinia, variola and varioloid. He

thinks he has detected a certain motility in the micro-organisms and is sure that they grow in size and number with the age of the lesions. Other observers claim that the appearances noted are due to degenerative intracellular changes which cause certain parts of the protoplasm of the cell to take the stain in a different way to the rest of the cell.

Personal Experience.—Dr. Williams has found the appearances that are said to be those of the microbe in question in corneal cells thirty-four hours after the injection of material from vaccinal lesions, which also contained these appearances. The characteristic intracellular bodies were noted especially before the leucocytes had gathered in any numbers. Leucocytes apparently prevented the further growth of the micro-organism. Usually one of these supposedly protozoic bodies was found near the nucleus of the cell. At times two were to be seen and there were signs of recent division having taken place. In vaccinal lesions these bodies are found everywhere excepting in the stratum corneum of the skin. They occur especially in the hair-follicles and in the sebaceous glands, the epithelial cells of which seem to furnish a proper habitat for the protozoon. At times the protozoic body is as large as the nucleus of the cell and it may cap it or shove it aside. These bodies disappear in five days from the calf's and in eight days from the rabbit's cornea. A series of experiments and observations undertaken in conjunction with the New York Board of Health shows that whenever these bodies occur in vaccine material the virus is active and is capable of producing vaccinal immunity. Where these bodies do not occur the vaccine matter fails to take satisfactorily.

Revaccination.—In discussing the papers on vaccination, Dr. W. A. Dunckel said that the question of revaccination is the most important one for the medical world now. It has been demonstrated that the protection afforded by vaccinia may run out even in five years. The effect of vaccination on other skin eruptions is exaggerated. Dr. Dunckel saw recently a tuberculous, pustular eruption widely distributed develop just ten days after vaccination. Besides this tinea occurred on the face and head. The case was a puzzling one, and the history seemed to point to the existence of syphilis. Investigation proved that this was the cause and the therapeutic test confirmed this diagnosis.

Vaccination Shields.—Dr. Dunckel expressed himself as thoroughly opposed to the use of shields. The protection afforded is very slight while the chances of infection are added to. Almost any form of shield leads to some constriction of blood vessels and causes the vaccinal ulcer to run a slower course and to cause deeper destruction of tissue than would otherwise occur.

Dr. Dunckel has seen a recrudescence, after a second inoculation had been made, of a vaccine inoculation which apparently was not going to take. This recrudescence took place when the original inoculation was nine days old. Both inoculations took at about the same time and ran their course together. Such delay is unusual, but must be remembered. In about fifty per cent. of the cases of children whose mothers were vaccinated after the seventh month of intra-uterine life was passed, vaccination immediately after birth did not take. Barlow has shown that vaccination on a supernumerary finger, the finger being removed on the third day after inoculation practically never failed to take.

Dr. Bartlett said that sixty to seventy per cent. of children vaccinated in infancy may be revaccinated successfully between the ages of eight and thirteen years. In recent years we have learned that the glycerinated vaccine virus is much more effective than the fresh untreated virus. Certain cases of vaccination produce a keloid excrescence in the skin. The protective power of this is almost nil. These unusual forms of vaccination scar have become much less frequent of late years. Failures to take are also much more rare. Last year in a large number of vaccinations from January to June, Dr. Bartlett had not a single failure. During the month of June there were eight failures. It is evident that the warm weather modified the virus sufficiently to prevent its being as effective as usual. The Board of Health vaccine virus has been most efficient. For a while when it was difficult to procure Board of Health virus because of the demand, some virus from a private source was employed. This did not prove so satisfactory. The number of marks made at the original vaccination seems to make very little difference. One successful inoculation seems as effective as three.

Defense of Shields.—Dr. Bovaird said that he has had excellent results from the use of shields. They practically do away with all the discomfort of vaccination and so tempt parents to have their children vaccinated more readily than would otherwise be the case. He uses a stout wire shield 2½ inches in diameter, which is applied by means of rubber adhesive plaster, or still better by means of zinc oxide plaster. When firmly put on in this way it remains for three or four weeks and proves a thorough protection for the vaccine ulcer all during its course. If necessary it may be renewed and it should, of course, occasionally be seen by the doctor. The best proof of its usefulness is the testimony of patients as to the comfort experienced in revaccination. People have noticed so much difference between the discomfort felt at the previous vaccination and at this one protected by a shield that they have considered the latter method a great improvement.

Against Shields.—Dr. Kerley said that he is opposed to the use of shields. During the present winter he has done about 700 vaccinations in private practice. Only in cases in which sheilds were used were there any sore arms. Shields were used by certain patients contrary to his advice. In nearly every one of these cases the vaccination ran a longer, severer course than in those in which the inoculated spot was left unprotected. The manner of putting on shields produces too much tension, disturbs the circulation in the neighborhood, makes the tissues more liable to break down, prolongs the course of healing, and leaves a deep scar.

Number of Inoculations.—In closing the discussion Dr. Fielder said that we do not know whether inoculation at several points produces better protection than inoculation at a single point. As much vaccinal material can be put into one well bared spot as into three very small ones. Immunity and susceptibility seem to be absolutely indifferent to the number of scars that exist provided one good scar surely is present. It is probable that there is some slight protection afforded by the raspberry excrescence, but this is only temporary. Such patients sometimes fail to take on immediate revaccination, but after a month or six weeks, revaccination is usually successful.

Aseptic Skin.—It is practically impossible to produce absolutely aseptic skin for the place of inoculation. Antiseptics may be used freely, however, in washing the skin and they will not interefere with the action of the virus if it is good. Washing with 1-1000 bichloride has been employed without interfering in the slightest with the success of the vaccination. As a rule it seems sufficient to clean the arm thoroughly with alcohol. Any one who has done many vaccinations, however, will remember cases in which the vaccination on dirty arms ran an absolutely uncomplicated course, while after the most thorough cleansing, infection is sometimes noted almost before the vaccination itself begins to take. Beneath shields it is not unusual to have macerations of the skin occur and then maceration of the underlying tissues is a result of the failure of ventilation. These conditions may even lead to the development of a running sore that takes a long time to heal.

Undoubtedly vaccination during pregnancy has some influence on the child then being carried. Twelve out of fifty infants vaccinated under these conditions prove refractory to vaccination. In no individual case, however, can this be depended on for protection and children must always be vaccinated as more than three-fourths of them are susceptible. A German observer has noted that forty-four out of fifty children born under this condition had some slight immunity, but this does not suffice as a safeguard.

Shields Harmful.—Dr. John H. Huddleston said that as the result of his experience he is utterly opposed to the use of shields. The only bad arms he has seen were in cases where shields had been employed. As a matter of fact the physician should watch at intervals of several days the course of the vaccine ulcer. Most mothers hesitate to dress an ulcer or have anything to do with the care of it, but put it under a physician's care. Somehow, however, the vaccine ulcer is supposed to be an exception. It is cared for at home, or no attention at all is given to it, until serious complications set in.

The individual reaction to vaccination is very different. In two cases where the vaccination takes promptly and effectively one will have scarcely any sore, the other considerable loss of tissue. The use of disinfectants before inoculation with vaccine material seems to have very little effect in protecting an individual from secondary infection. Infection when it takes place occurs after the vaccine ulcer has been established. The size of the area scarified for vaccination is important. Where the area is large more necrosis takes place and more opportunity for infection is afforded.

Vaccine Organism.—The question of the microbe of vaccinia is of course extremely interesting. The bodies described by Dr. Williams that occur in certain cells during the course of the vaccination represent very probably the best claimant as the microbic cause of the disease. In this matter some very interesting experiments have been done on the horse. The horse is refractory to vaccination and one is not sure of always obtaining a successful result. It is only when the bodies described by Dr. Williams occur in the equine tissue that there is any assurance that the vaccine matter furnished by the horse will surely communicate vaccinia. Where these bodies do not occur no true vaccine material is manufactured.

MEDICAL SOCIETY OF RUSH COLLEGE.

Stated Meeting, Held February 4, 1901.

Anatomy of Pregnancy.—Dr. J. Clarence Webster demonstrated specimens illustrating the anatomy of pregnancy as studied by frozen sections; also a specimen of ruptured uterus removed from a woman in whom there had been a neglected impacted face presentation.

Acute Intussusception.—Dr. Philip Schuyler Doane reported a case of acute intussusception in an infant with operation and recovery. Relapse in three and a half months with second operation and recovery. A healthy, female child, three months old, screamed out suddenly with severe pain,

turned pale, was somewhat cyanotic, began to vomit. Three hours later there was a passage of blood and mucus *per rectum*. The pulse was rapid and weak; temperature, sub-normal. A mass was detected in the ileocecal region. There was no reduction of the tumor after a high rectal enema. Seven hours after the first symptom an operation was done by Dr. F. Henrotin, in whose practice the case occurred, and a single intussusception was found, about fifteen centimeters of the small intestine with a portion of the cecum being invaginated into the large intestine. This was easily reduced and the child made an uneventful recovery. Three and a half months later there was a recurrence of the intussusception, the symptoms being so like the first that the mother made the diagnosis and hurriedly summoned a physician. An operation was done ten hours after the first appearance of pronounced symptoms, the child being in a serious condition. No reduction of the intussusception which was found after the abdominal incision was possible by injection of air into the intestine. After considerable difficulty, the invagination was reduced. The partially gangrenous appendix was removed and three stitches of fine catgut were then placed in the walls of the ileum and cecum, near their junction in such a way as to make almost an acute angle. The child made a good recovery. She was seen by Dr. Doane seven months after the operation and was apparently in perfect health. The importance of very early diagnosis and immediate operation was dwelt upon.

Pseudo-Phosphaturia with an Unusual Complication.—Dr. Alfred Schalek said that true phosphaturia is a pathological condition in which an excessive amount of phosphates is excreted. It is due to some disturbance of the general metabolism. Systemic symptoms are usually present, such as general or local neuroses, disturbances of the gastro-intestinal organs, general fatigue and loss of flesh. If free urination is prevented in some way, calculi may form in the kidneys or the bladder. Other local complications are rarely mentioned in the literature. A case is cited here, in which phosphatic deposits, consisting of large masses of amorphous phosphates of lime, were persistently present in the urine, the time extending over three years. The white sediment formed in the bladder and amounted, by sight, to about one-quarter of the volume of passed urine. The urine was alkaline from fixed alkali. The patient was decidedly neurasthenic, and lost twenty-five pounds in weight after the phosphaturia began. During all this time he suffered from a purulent urethral discharge, which may have been originally of gonorrheic origin, but which while under observation on repeated examinations never revealed any gonococci. This, and the fact that no lesions were found in any part of the genito-urinary tract, with the coincident presence of the phosphates in the urine, led to the conclusion that the latter were the cause of the irritation of the urethral mucous membrane. Various attempts were then made to correct this anomalous feature. Urotropin finally accomplished this, though only during the time of its administration. The urine cleared up and shortly afterward the urethral discharge disappeared. Several times the urotropin was discontinued, with the consequence that the whole cycle of symptoms reappeared. This proved the relation between the phosphaturia and the urethritis. The rationale of the action of the urotropin upon the excretion of phosphates is obscure. It is too weak a base to influence the reaction of the urine; neither can its antiseptic properties be taken into account in the absence of any pathological conditions of the genito-urinary passages. The quantitative analysis gave the rather surprising result that the amount of phosphates was normal, in spite of their persistent deposition in the urine and their obvious effect upon the general system.

BOOK REVIEWS.

A CLINICAL TREATISE ON FRACTURES. By WILLIAM BARTON HOPKINS, M.D., Surgeon to the Pennsylvania Hospital, and to the Orthopedic Hospital and Infirmary for Nervous Diseases. J. B. Lippincott Company, Philadelphia.

IN this volume the author has given his views and ideas on the treatment of fractures in all parts of the body. He also discusses the etiology of the different kinds of fractures, and the deformities as he has observed them, as well as the points of diagnosis. The treatment is given very clearly and concisely, and forms the greater part of the book. The volume is profusely illustrated by photographs and skiagraphs. The book, however, is printed upon such thick calendered paper that it is unpleasant to handle.

ENCYCLOPEDIA MEDICA. Edited by CHALMERS WATSON, M.B., M.R.C.P.E. Vol. V.: Herpes to Jaws; Vol. VI., Joints to Liver. Longmans, Green & Co., London, New York and Bombay.

THE scope of this Encyclopedia has been sufficiently indicated in our reviews of the previous four volumes. Among the more notable articles in Vol. V. may be mentioned those on Hysteria, Hip-Joint Disease, a most excellent discussion, Hypnotism and Diseases of the Intestines. The subject of Immunity is very thoroughly treated, as is also that of Hypnotism and Invalid Feeding. This last topic is most carefully and elaborately gone into. The illustrative features of this volume are not worth mentioning.

In Volume VI. the subjects of Diseases of Joints, Kidney Affections, the Larynx and Its Diseases, Labor and Leprosy, practically take up the entire space. The discussion of Labor is

lengthy and excellent, but miserably illustrated. The practical features of the work are still in evidence. There is much to be desired in the more strictly technical and scientific features of the work. Here the work often lags behind our standard text-books. We note the continued absence of any mention of any drugs or anything bearing on pharmacotherapy.

THE PRACTICE OF MEDICINE. A Text-Book for Practitioners and Students, with special Reference to Diagnosis and Treatment. By JAMES TYSON, M.D., Professor of Medicine in the University of Pennsylvania. Second Edition. P. Blakiston's Son & Co., Philadelphia.

THERE is little to be said in further comment on this, the second, edition of Tyson's Practice than was said in our review of the first edition. It is a work creditable to both writer and publisher alike. The changes which have been made in this new edition have been mainly in the chapters on the infectious diseases and the nervous system. The necessary changes incident to the rapid increase in knowledge concerning bacteria have been made and the section on the infectious diseases, from a descriptive standpoint, at least, compares very favorably with anything we have in the English language.

The section on diseases of the nervous system has been entirely recast. It is a thoroughly trustworthy guide to the student and is particularly commendable in that so much information has been compressed into comparatively few pages. The discussion on cerebral hemorrhage is above the general average text-book presentation of this subject.

THERAPEUTICS: ITS PRINCIPLES AND PRACTICE. By HORATIO C. WOOD, M.D., LL.D. Eleventh Edition. Remodeled and Rewritten by HORATIO C. WOOD and HORATIO C. WOOD, Jr., M.D. J. B. Lippincott Company, Philadelphia and London.

IT is a tax on the reviewer's ingenuity to be able to say anything new when an eleventh edition is under consideration and for the most part it is unnecessary when such a veteran as this is to be discussed. There are, however, some radical departures from the older editions in this new one. With such as are concerned with a change in form, the reader is little interested, although the cumbersome style, which was the inevitable result of the interpolations due to successive revisions, was a distinct drawback to earlier texts. The entire rewriting of the text, therefore, in this edition has given it a continuity which before it greatly lacked. The peculiar choppy sentences of the older editions, cut up as they were with references to all the old monographs, have disappeared and there is presented a continuous account of the subject which is much more easy to read.

Another feature, which will undoubtedly prove of service to the busy man, is the short summary, printed in heavy type, which accompanies each drug. This adds a pedagogic value to the work which has always been lacking. It makes it a work for students as well as for specialists.

In this new recasting the work regains its old time position, as perhaps our best exponent of the practice of rational therapeutics.

TEXT-BOOK OF PHYSIOLOGY. Edited by Dr. E. A. SCHAFER; Professor of Physiology, University of Edinburgh. Volume II. The Macmillan Company, New York.

AT the outset it may be said that we consider this the best text-book presentation of the subject-matter of physiology extant, recent Continental text-books notwithstanding.

One of the reasons for this statement is the wide cosmopolitanism shown in the individual chapters. The separate sections are treated by men of acknowledged reputation and in their mode of handling the subjects, they have left little of value unstated and have reduced many physiological monographs to their essentials.

Comparisons are out of place in a discussion of the merits of the different sections, but special praise is due to the editor for his able handling of the intricate subject of the nerve-cell and to Drs. Langley and Sherrington for the chapters on the sympathetic nervous system, the spinal cord and lower cerebral centers. Dr. Langley's chapter on the sympathetic and its relations is particularly valuable at this time when epoch-making researches in this field of physiology are imminent. An interesting and instructive chapter on the physiology of electrical organs is contributed by Dr. Francis Gotch and the discussion of the nature of the electrical reactions to nervous stimuli is suggestive and timely. Hill's study of the mechanism of the circulation of the blood is a most valuable chapter, based largely on Tigerstedt's masterly monograph.

The publishers' part has been most admirably carried out. These volumes are indispensable to the physiologist, necessary for the student and of supreme value to the practitioner.

APPENDICITIS AND ITS SURGICAL TREATMENT, WITH A REPORT OF ONE HUNDRED AND EIGHTY-FIVE OPERATED CASES. By HERMAN MYNTER, M.D. J. B. Lippincott Co., Philadelphia.

THIS is the third edition the author has brought out and it has been thoroughly revised and brought up to date. The histories of the cases have been omitted in this edition and in their place a classification according to their different forms has been substituted. The volume opens with a historical introduction, and the anatomy and histology of the appendix are minutely described. Under etiology, some of the predisposing causes mentioned are indigestion, constipation, previous attacks,

movable kidney, and constitutional disturbances, *e.g.*, tuberculosis, rheumatism, typhoid, dysentery, etc. Exciting causes are coproliths, foreign bodies, microbes, strictures, kinks and mechanical obstructions. Under pathology he makes use for descriptive purposes of three forms, simple catarrhal, ulcerated, and infectious appendicitis.

Clinically he distinguishes simple appendicitis, appendicitis with perforation and local circumscribed abscess, appendicitis with gangrene without perforation, appendicitis with gangrene, perforation and diffuse peritonitis, and chronic recurring appendicitis. The symptoms most frequently present are pain, tenderness to pressure, vomiting, constipation, rigidity of the abdominal muscles, tumor, chill, fever, costal respiration and leucocytosis. The treatment advised is surgical. The sooner these cases are operated on, the better, especially those beginning with acute pain, vomiting, rigidity, and fever which does not recede inside of twenty-four hours.

In this work the author has given us the conclusions arrived at by many of the surgeons, not only at home but abroad, and credits the Americans with first recognizing the fact that the disease is one for the surgeon to deal with exclusively. Its pages can be read with profit by both the surgeon and the general practitioner.

A MANUAL OF MEDICINE. Edited by W. H. ALLCHIN, M.D., F.R.C.P., London. The Macmillan Company, New York.

THIS is the second volume of Professor Allchin's Manual and contains a continuation of the subject of general diseases. The principal contents are diseases caused by parasites, diseases determined by poisons introduced into the body, primary perversions of general nutrition and diseases of the blood.

The chapters on obesity, on diabetes mellitus, on gout, on rheumatoid arthritis and on myalgia are very interesting, practical résumés of the present state of our knowledge with regard to these important but obscure conditions.

In the discussion of chronic rheumatism it seems too bad that more weight was not laid on the fact that careful differentiation will exclude, most of the symptoms ordinarily called rheumatic from any connection with chronic rheumatism. Most of the recurrent pains of patients beyond middle life are not rheumatic in origin, but are due partly to occupation neuroses, partly to injuries in early life and consequent interference with peripheral nerve nutrition and partially to vasomotor disturbances with a neurotic basis.

On the whole, this second volume maintains very well the thoroughly practical character of the first volume and gives promise that this set of handy medical manuals will be of distinct service to the practitioner.

OPHTHALMIC LENSES, DIOPTRIC FORMULÆ FOR COMBINED CYLINDRICAL LENSES. The Prism-Dioptry and Other Optical Papers, with 110 Original Diagrams. By CHAS. F. PRENTICE, M.E. "Opticist." Published by the Keystone, Philadelphia.

WITHOUT question figures, like those so generously employed by the author in the text of his papers, help the understanding. There is also undoubtedly a fair number of readers who wish for just this help in the optics of refraction, all the more because the ground covered is the least familiar to the average oculist. Therefore, we think many oculists will desire to possess and study this book. Yet, we must confess to a belief that not many of them will relish the complicated trigonometrical formulæ employed in Section II. to show the behavior of combined cylindrical lenses. Section III. has forces of a more practical character in its treatment of prism-dioptry, measurement of prisms, prescription of prisms, sphero-toxic lenses and refraction in presbyopia. The author deserves a fair meed of praise for these papers put together in such excellent form.

BOOKS RECEIVED.

The MEDICAL NEWS *acknowledges the receipt of the following new publications. Reviews of those possessing special interest for the readers of the* MEDICAL NEWS *will shortly appear.*

DISEASES OF THE ANUS AND RECTUM. By Drs. D. H. GOODSALL and W. E. MILES. Part I. 8vo, 310 pages. Illustrated. Longmans, Green & Co., London, New York and Bombay.

THE NURSING PROFESSION. How and Where to Train. Edited by SIR HENRY BURDETT. Demi 8vo, 370 pages. The Scientific Press, London.

A MEDICO-LEGAL MANUAL. By WILLIAM M. KEYSOR. 8vo, 317 pages. Burkley Printing Company, Omaha.

THE ESSENTIALS OF PRACTICAL BACTERIOLOGY. By Dr. H. J. CURTIS. 8vo, 289 pages. Longmans, Green & Co., New York, London and Bombay.

AN INTRODUCTION TO PHYSIOLOGY. By Dr. W. T. PORTER. 12mo, 314 pages. Illustrated. The University Press, Cambridge, Mass.

INTERNATIONAL CLINICS. Edited by Dr. HENRY W. CATTELL. Vol. IV., 1901. 8vo, 312 pages. Illustrated. J. B. Lippincott, Philadelphia.

TRANSACTIONS OF THE MISSISSIPPI VALLEY MEDICAL ASSOCIATION. Twenty-sixth Annual Session. Vol. II., 1900.

THIRTIETH ANNUAL REPORT OF BOARD OF COMMISSIONERS OF PUBLIC CHARITIES OF THE COMMONWEALTH OF PENNSYLVANIA for 1899.

THE YEAR-BOOK OF THE NOSE, THROAT AND EAR. Edited by Drs. G. P. HEAD and A. H. ANDREWS. The Year-Book Publishers, Chicago.

THE AMERICAN YEAR-BOOK OF MEDICINE AND SURGERY FOR 1901. In Two Volumes. Edited by GEORGE M. GOULD. W. B. Saunders & Company, Philadelphia and London.

OBSTETRIC AND GYNECOLOGIC NURSING. By Dr. E. P. DAVIS. 8vo. 402 pages. Illustrated. W. B. Saunders & Company, Philadelphia and London.